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FIG. 1A

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108-1064SA000

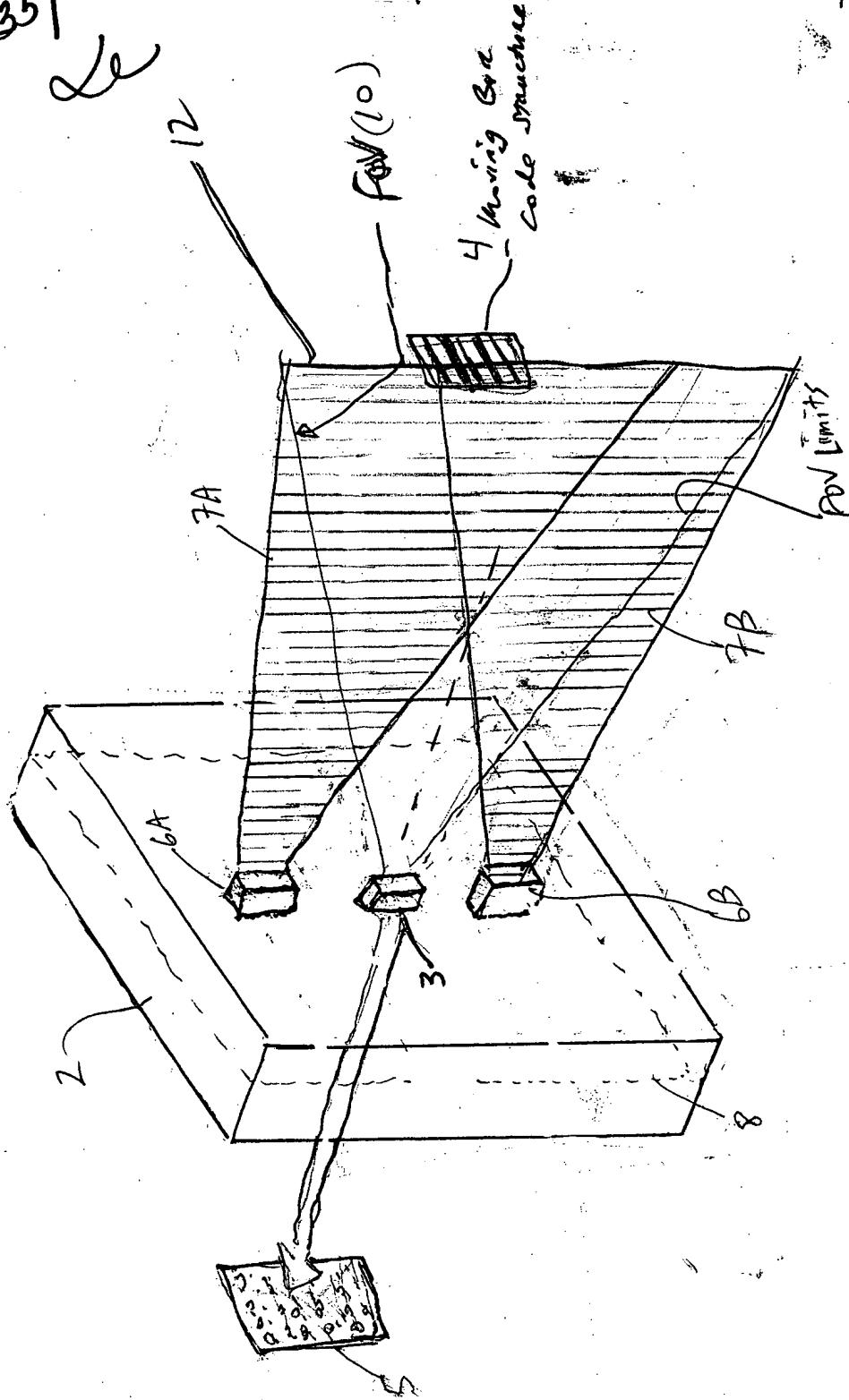


FIG. 1A

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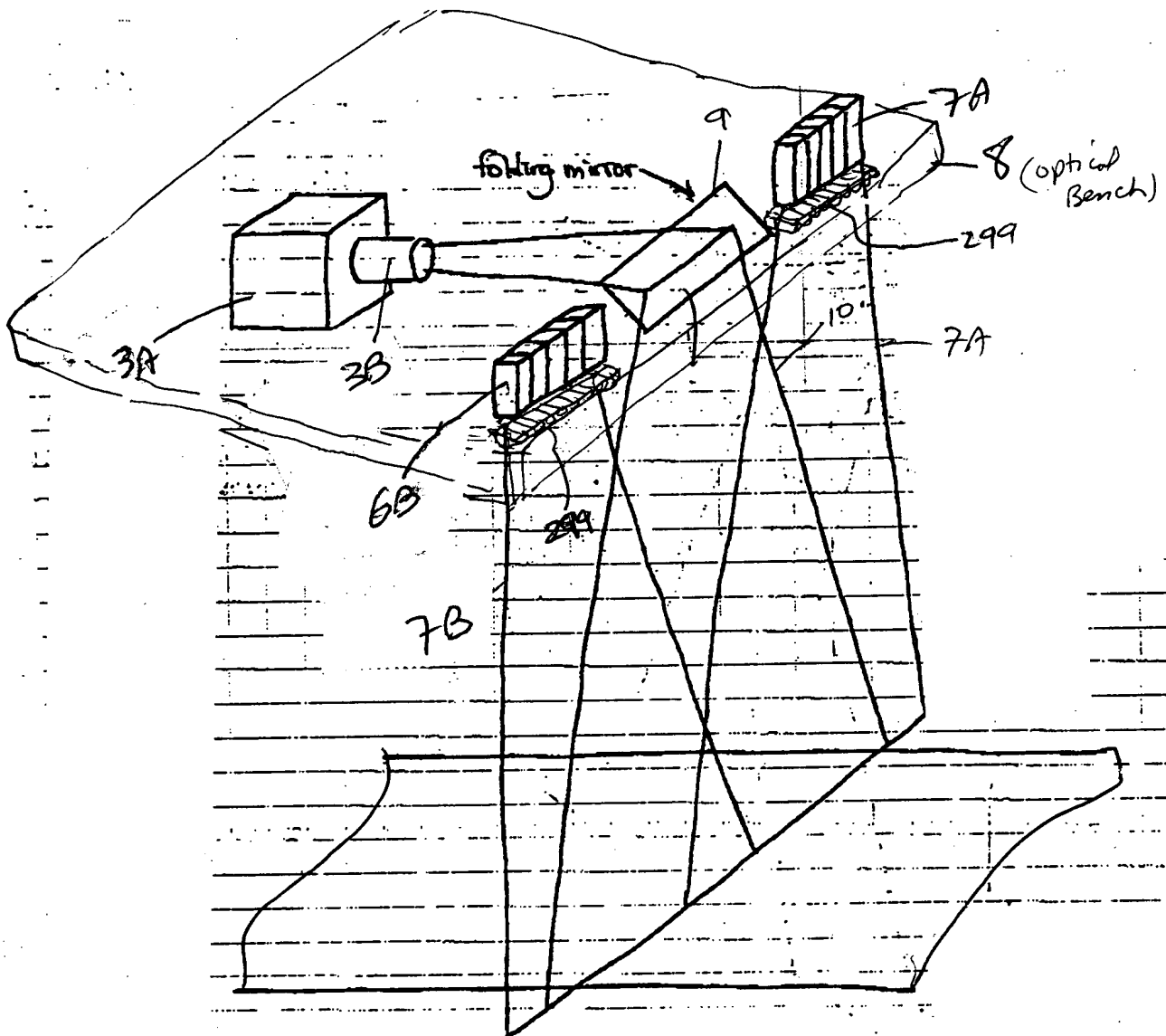
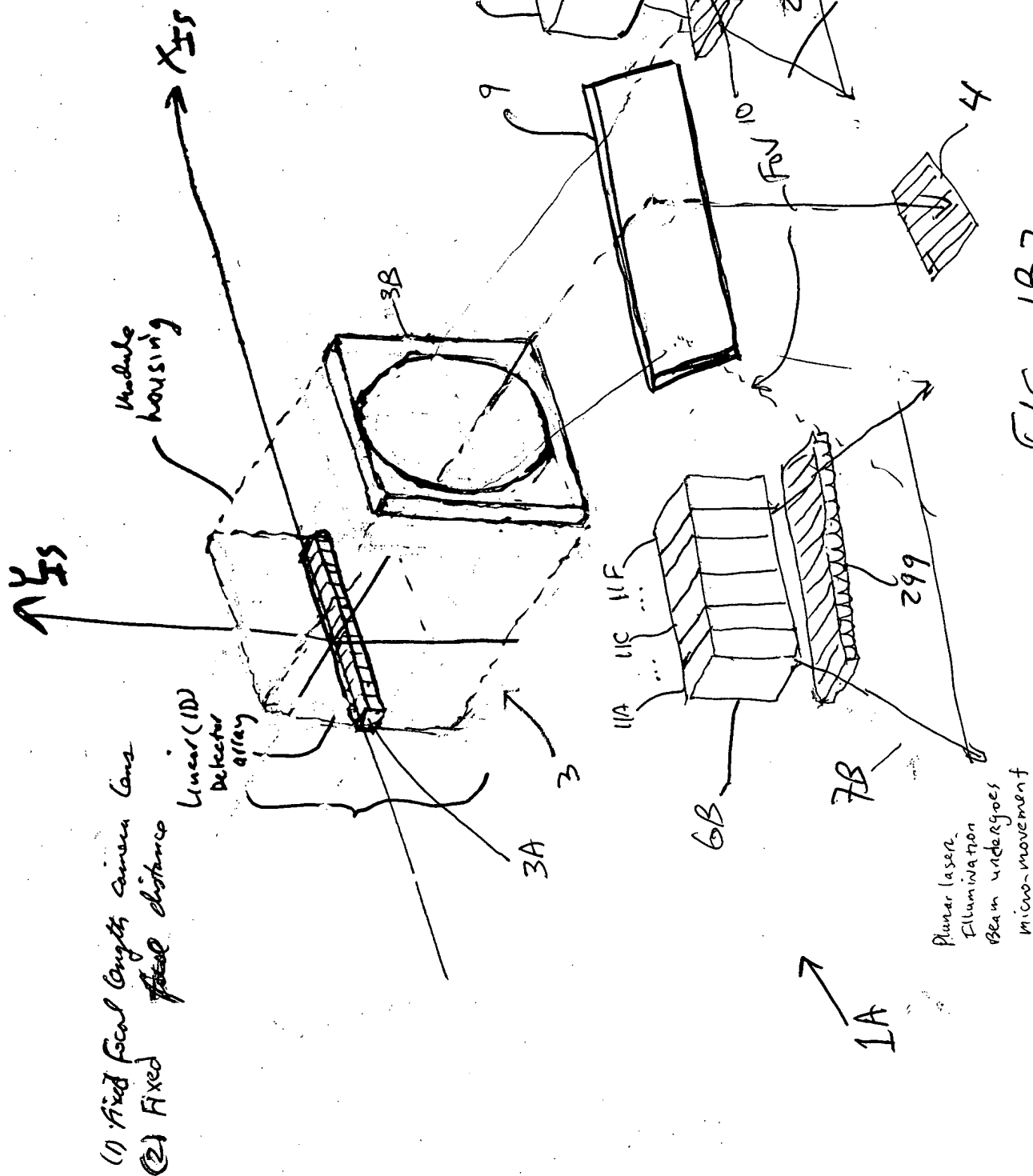
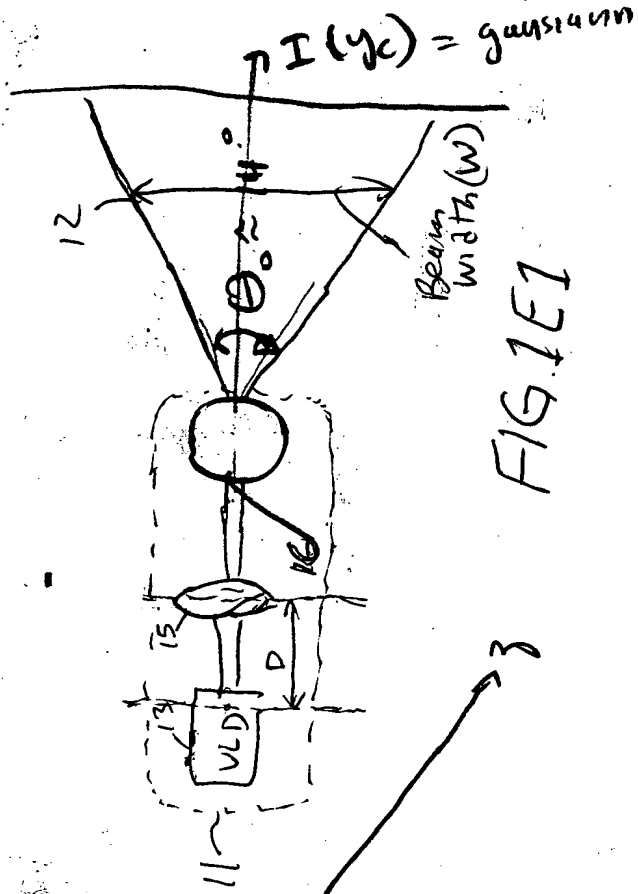
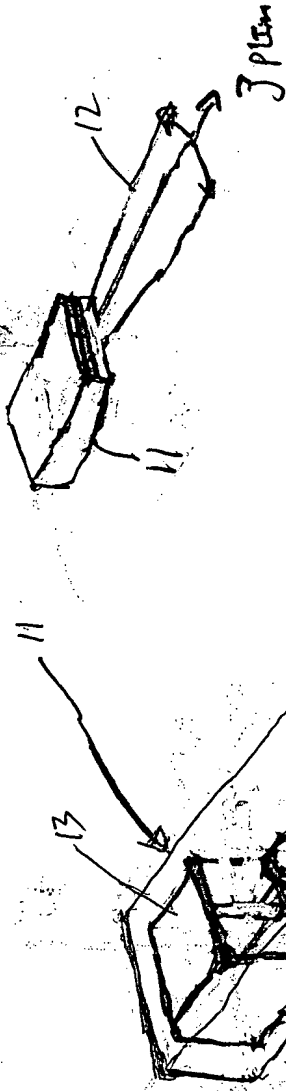


FIG. 1B1

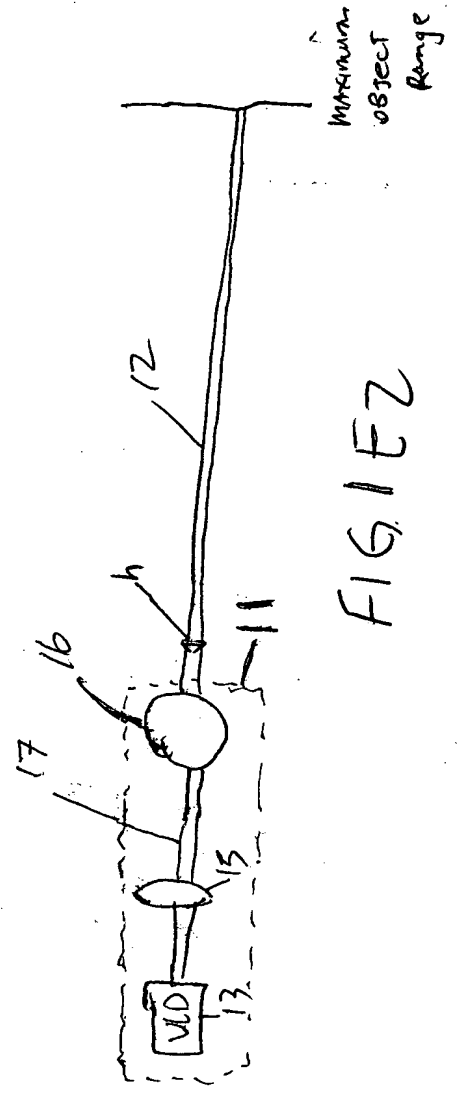
1A





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FIG. 1D



Maximum  
object  
Range

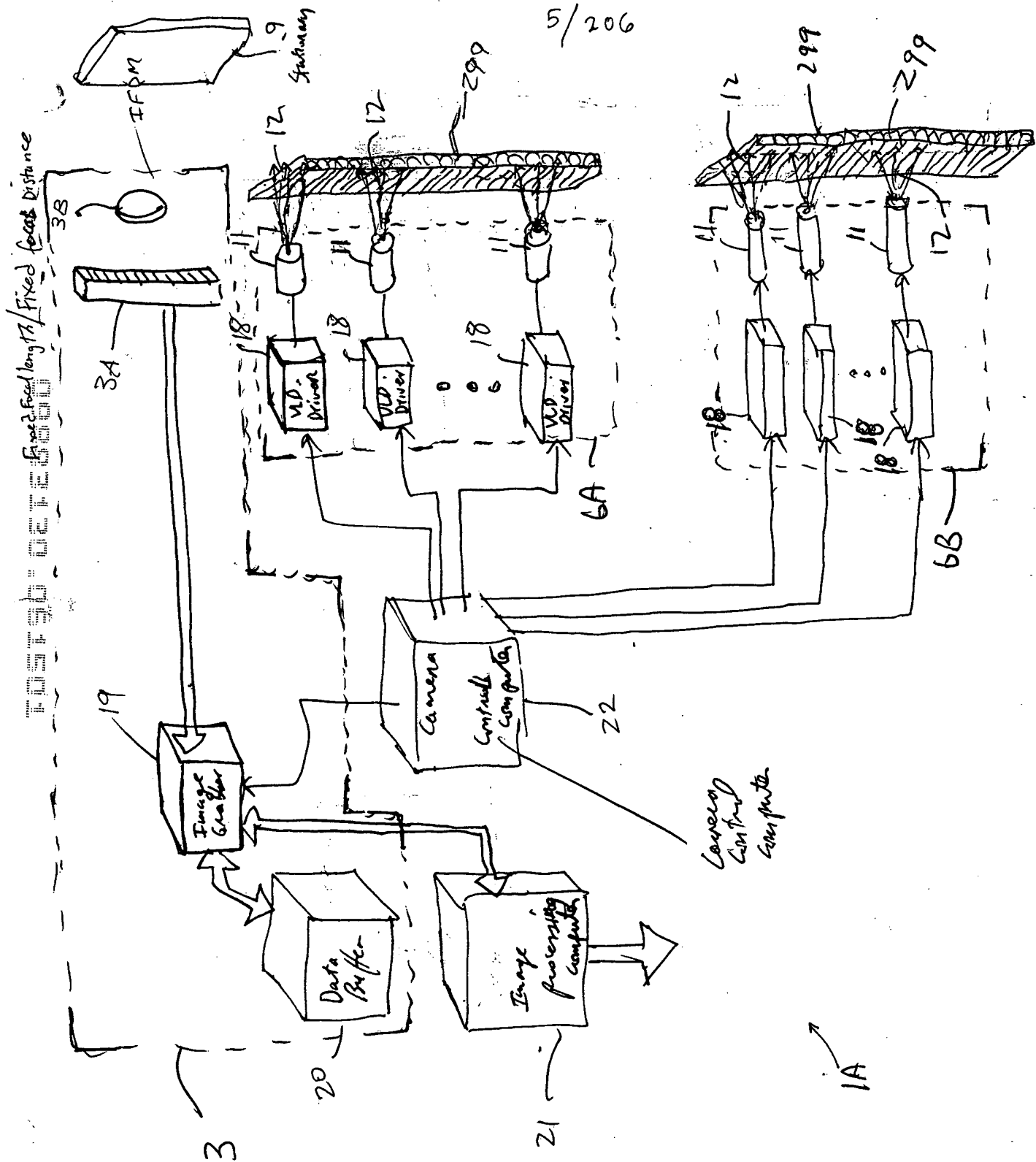


FIG. 1F

[illegible]

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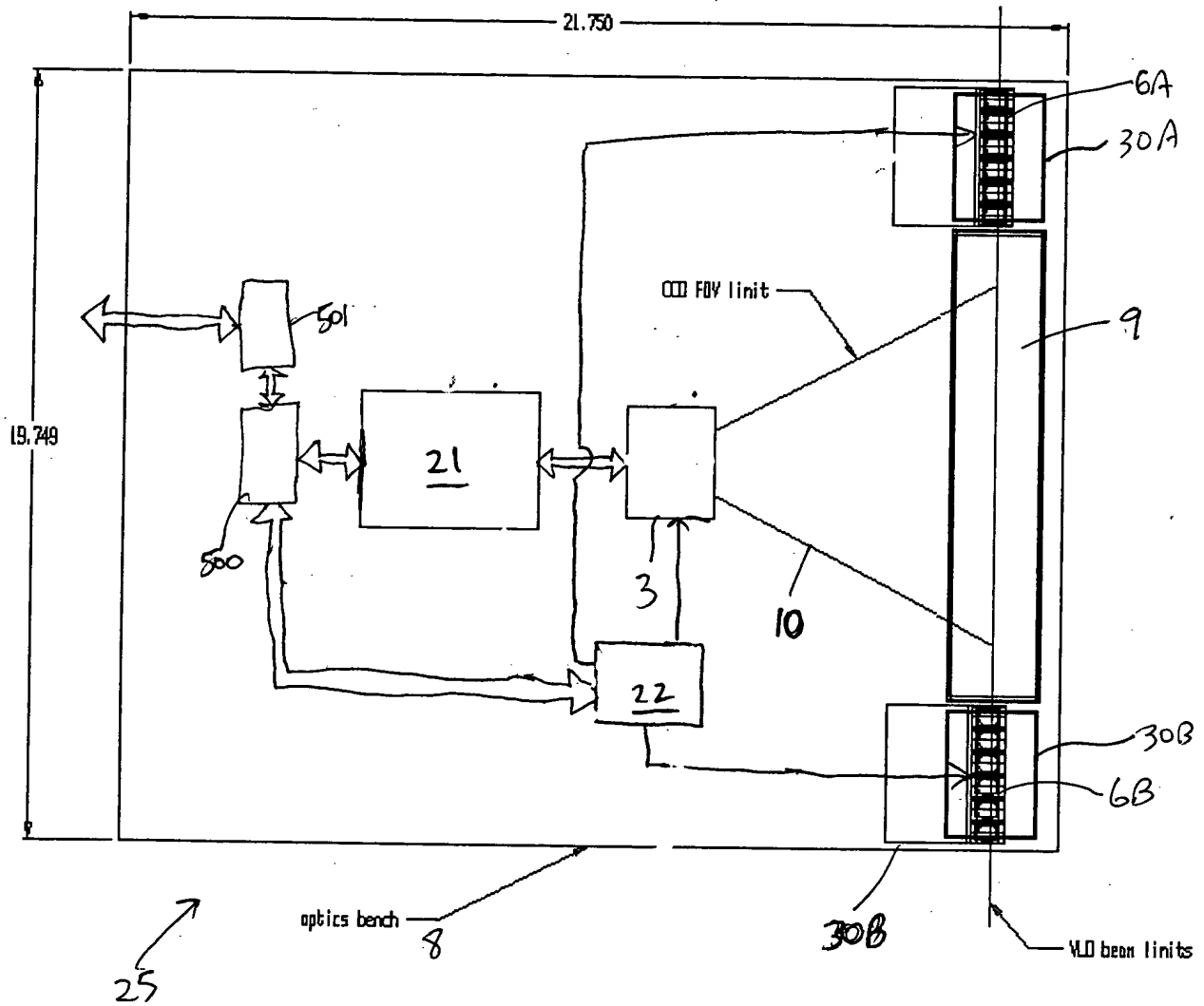
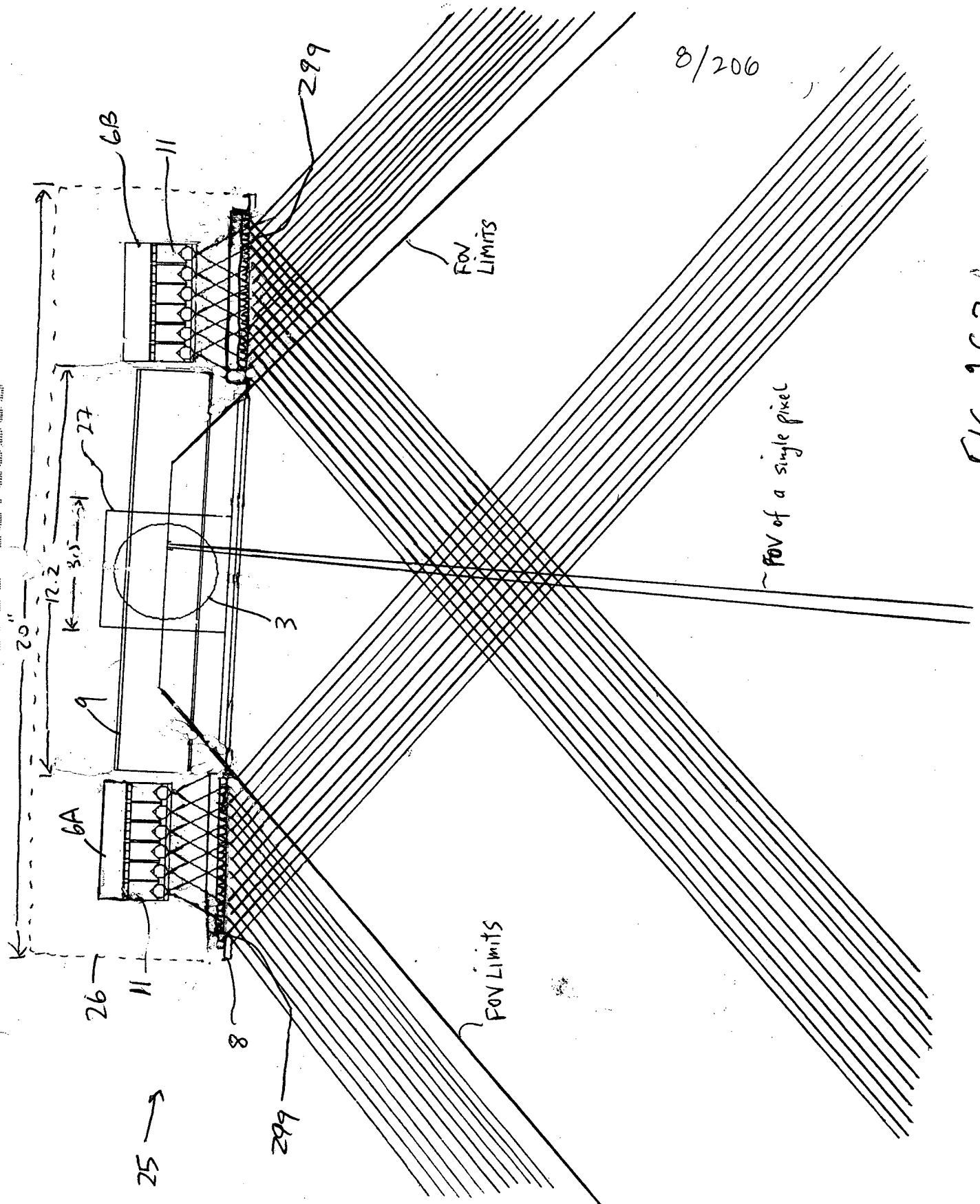


FIG. 1G2



FOI 50 OCT 66



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FIG 1G3

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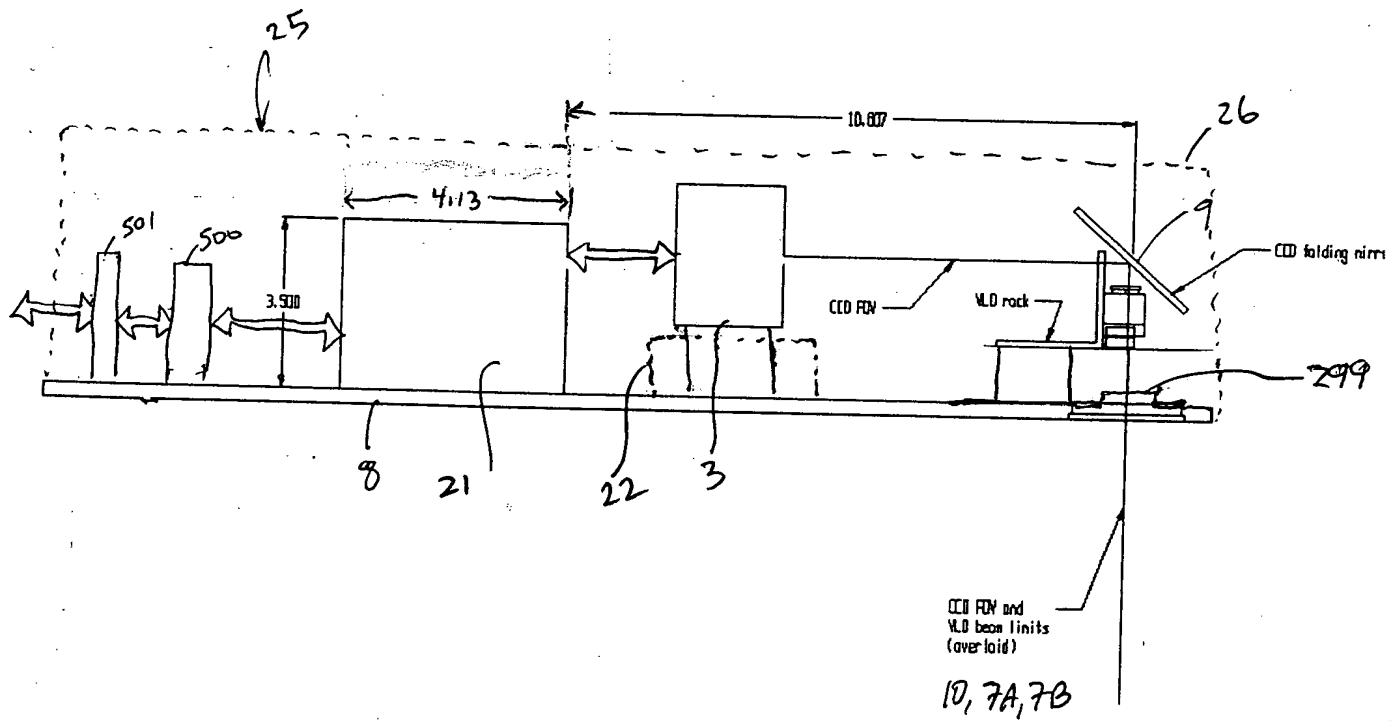
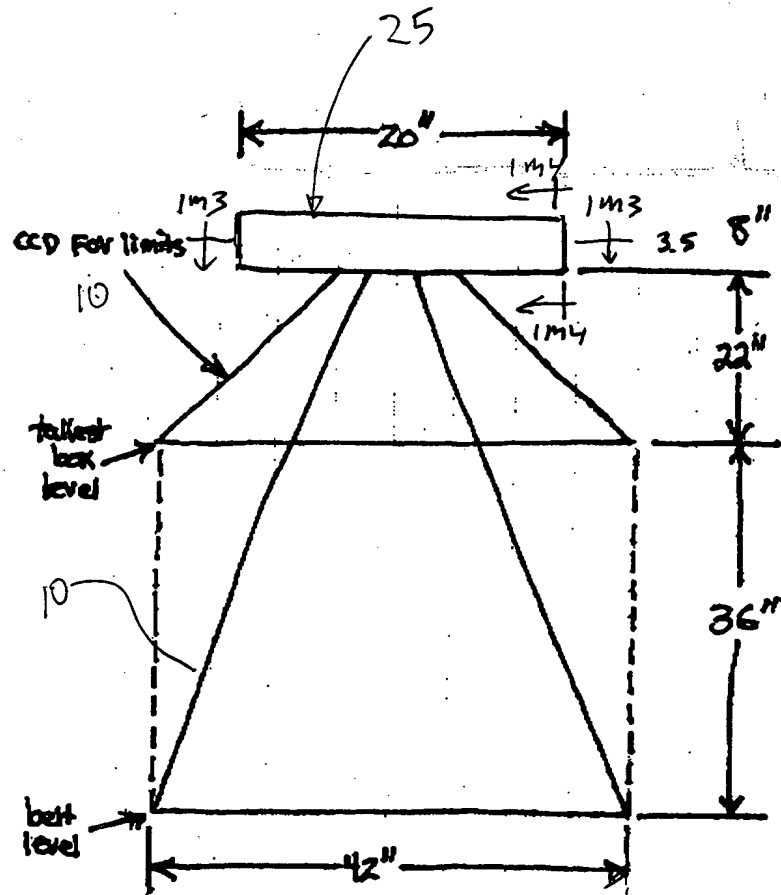


FIG. 164

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\* Fixed Field of Field

FIG. 1G5

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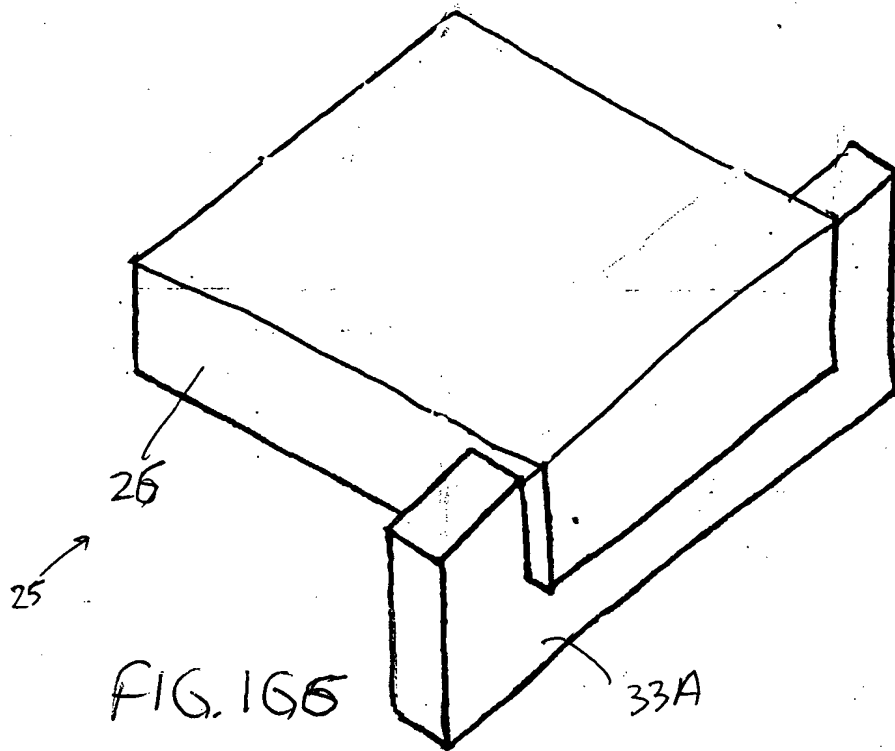


FIG. 166

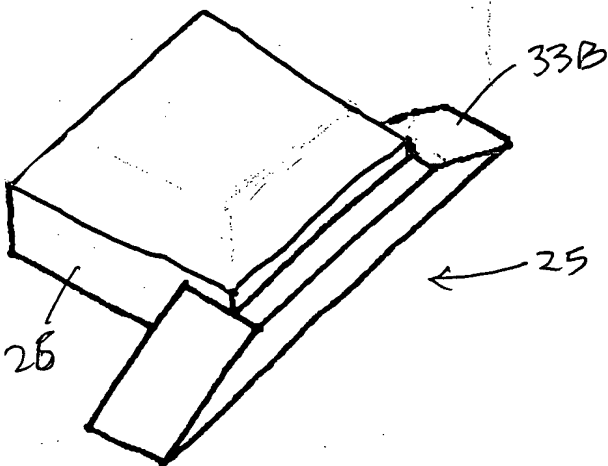


FIG. 167

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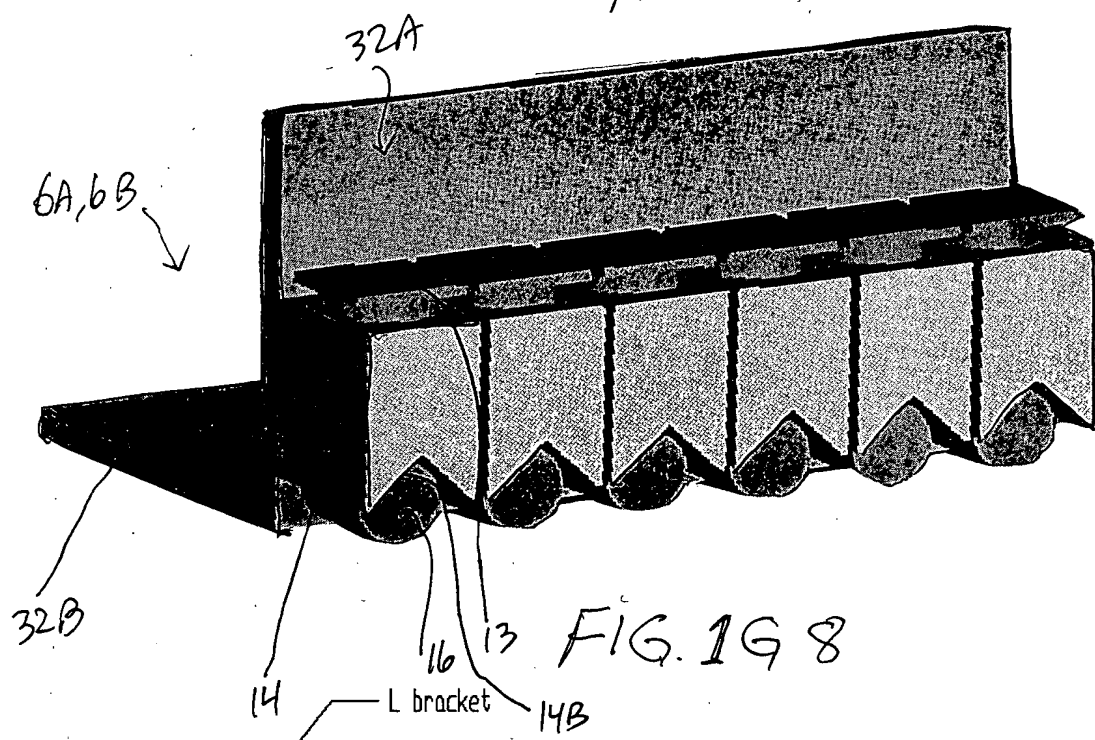


FIG. 1G 8

00003130 061504

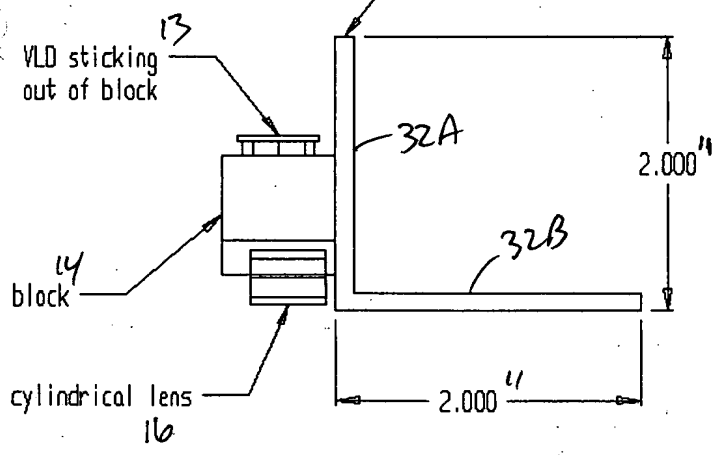


FIG. 1G.9

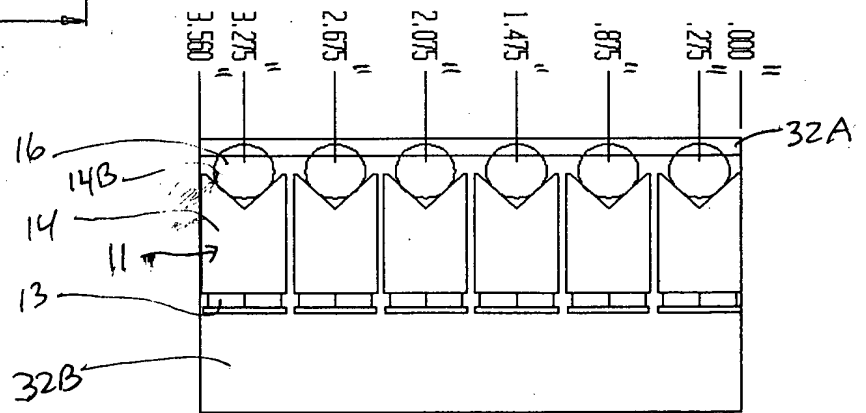
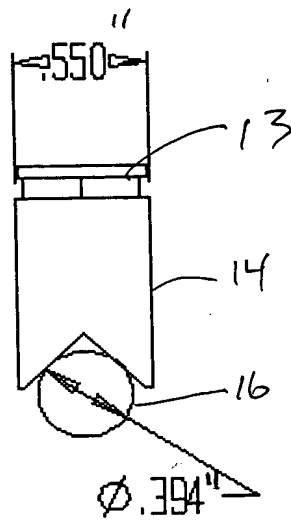
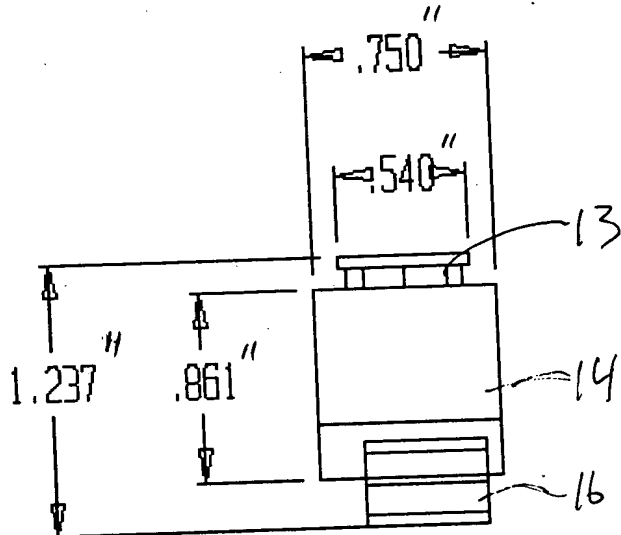


FIG. 1G10

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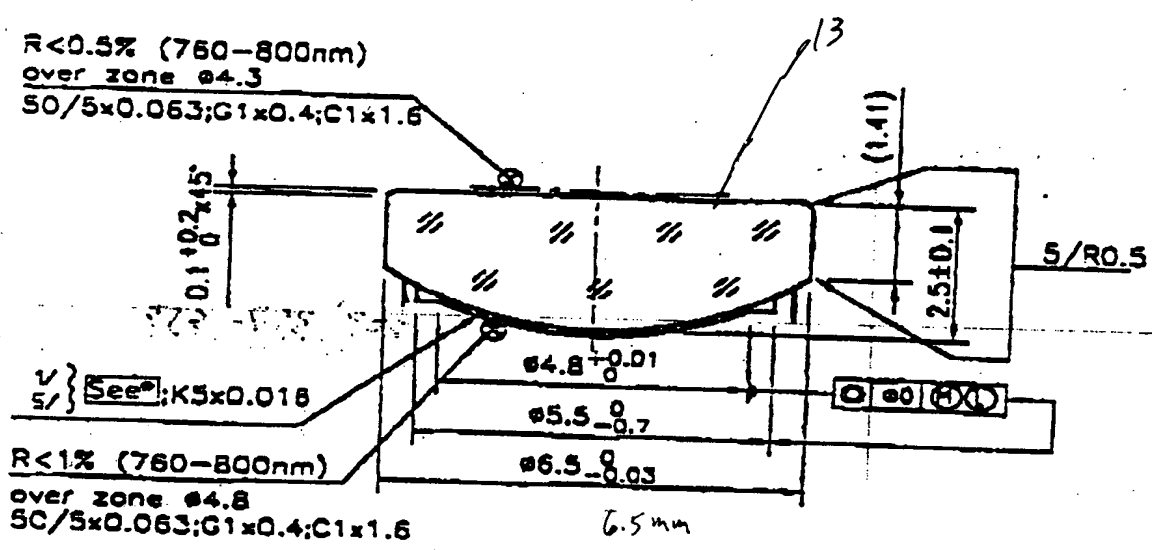


FIG. 1G13

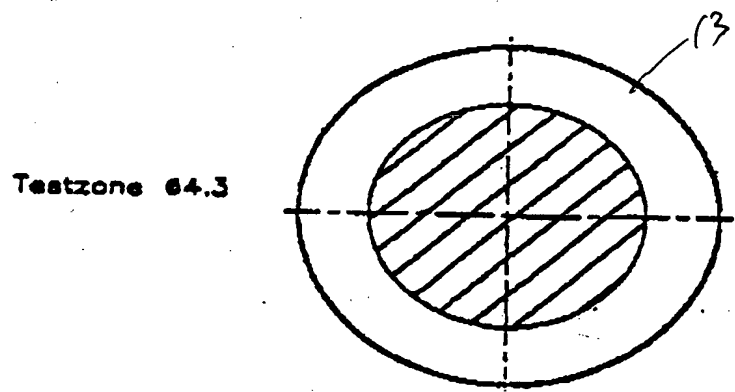


FIG. 1G14

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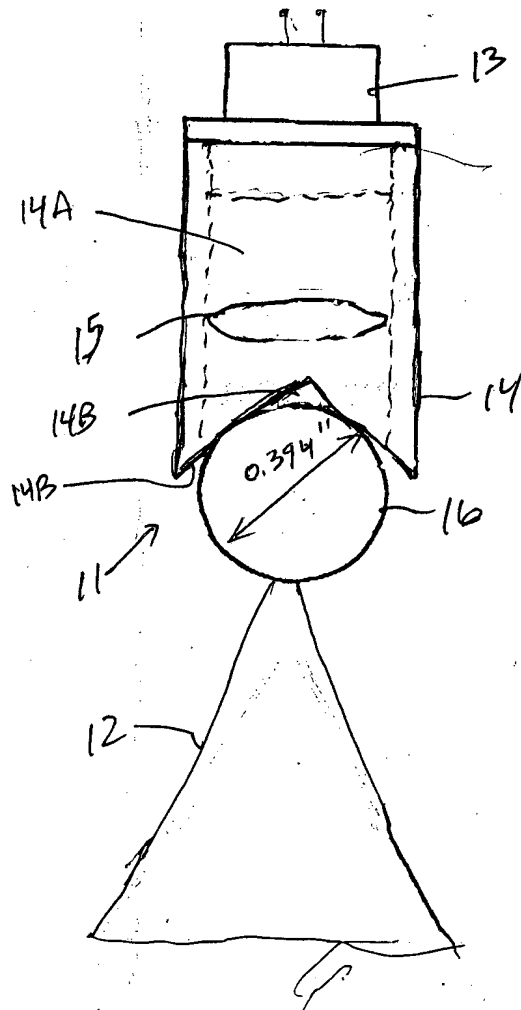


FIG. 1G15A

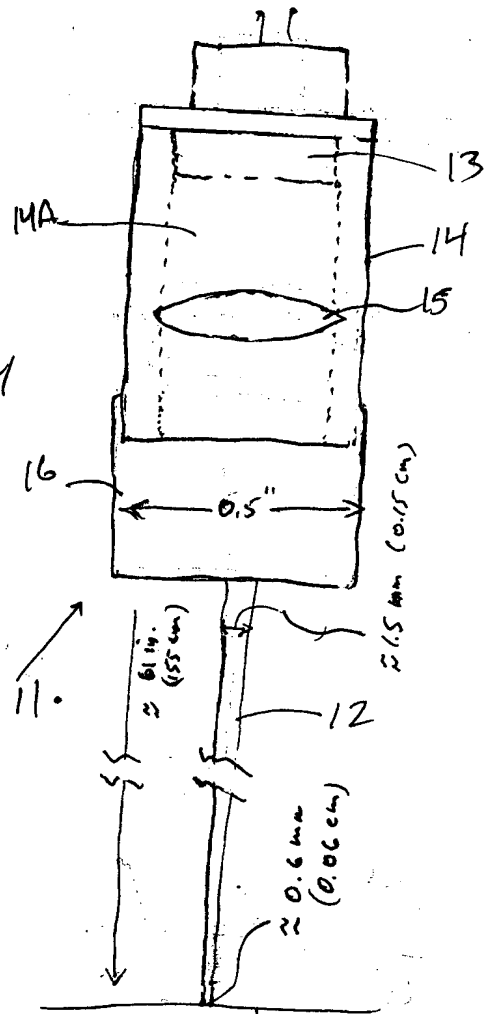


FIG. 1G15B  
furthest  
object/working  
distance



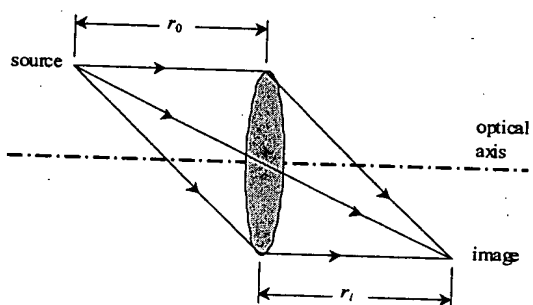
[illegible]

FIG. 141

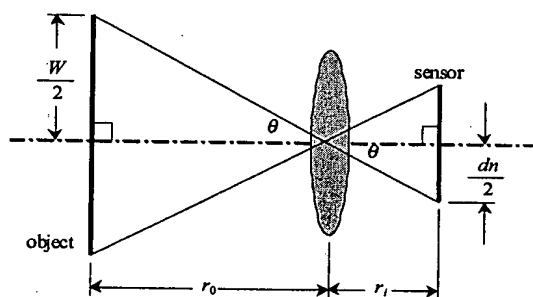


FIG. 1H2

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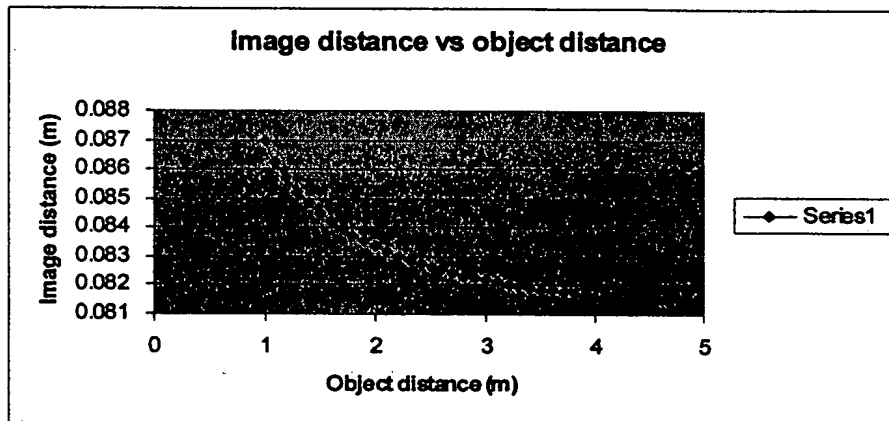


FIG. 1H3

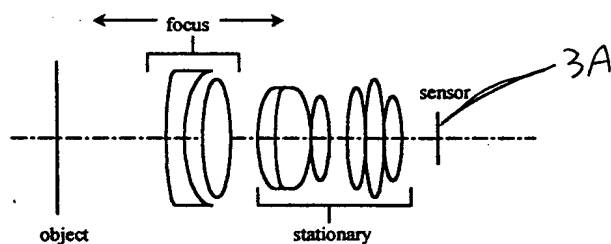


FIG. 1H4

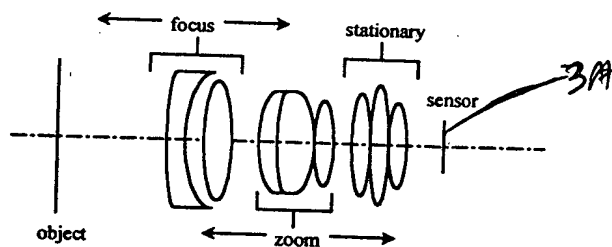
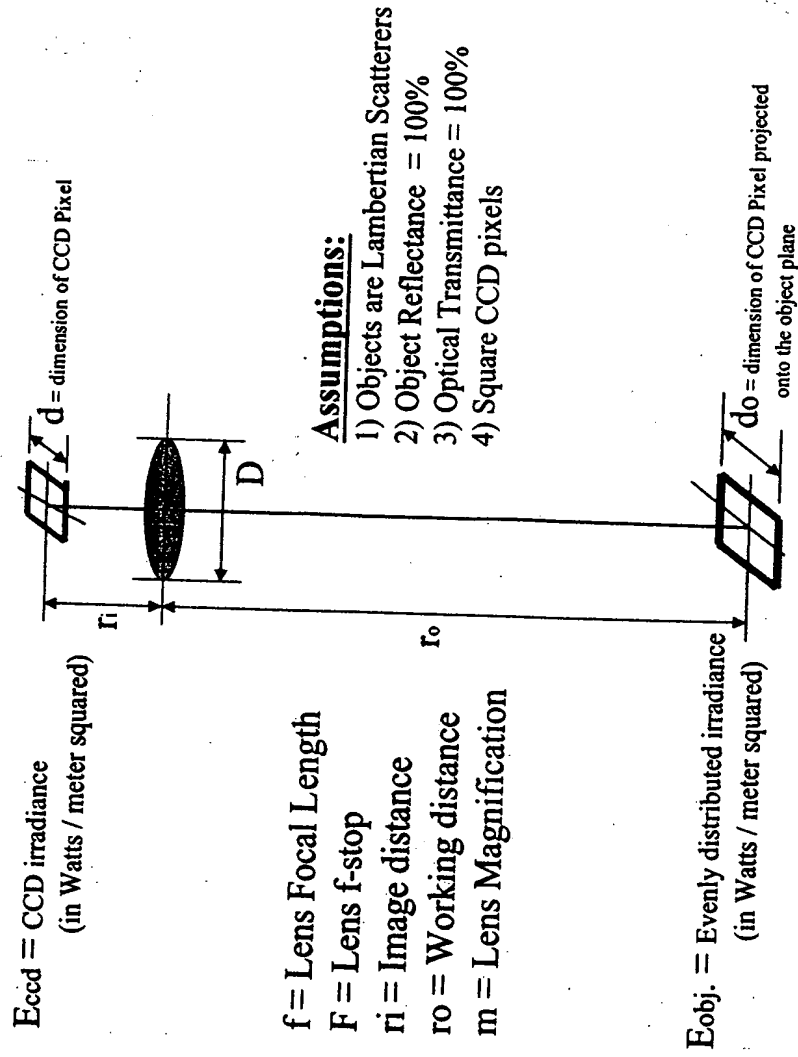


FIG. 1H5

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CCD-Based Scanner

FIG. 1H6

FIRST GENERALIZED METHOD  
of Reducing Speckle-Noise  
PATTERNS AT IMAGE  
DETECTION array OF THE  
FPD subsystem (3)

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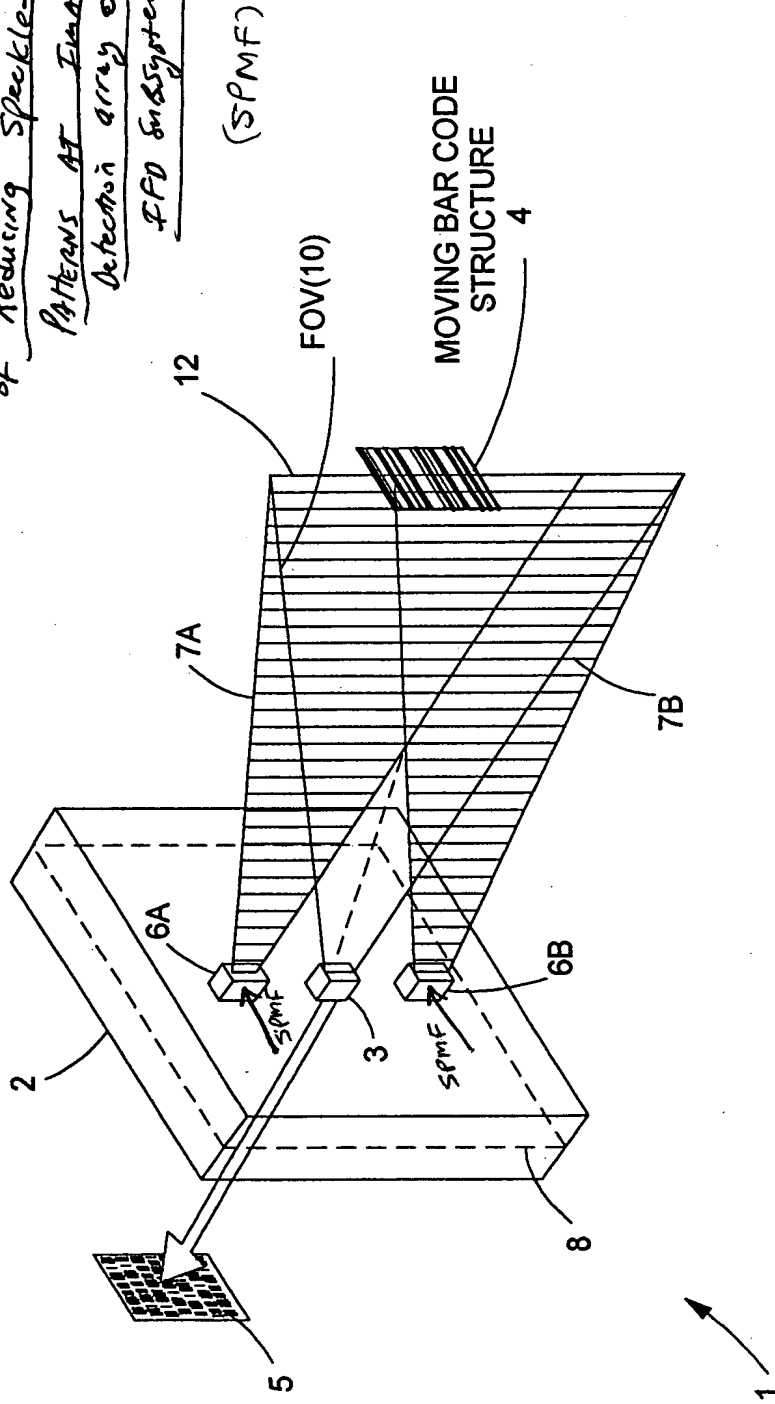
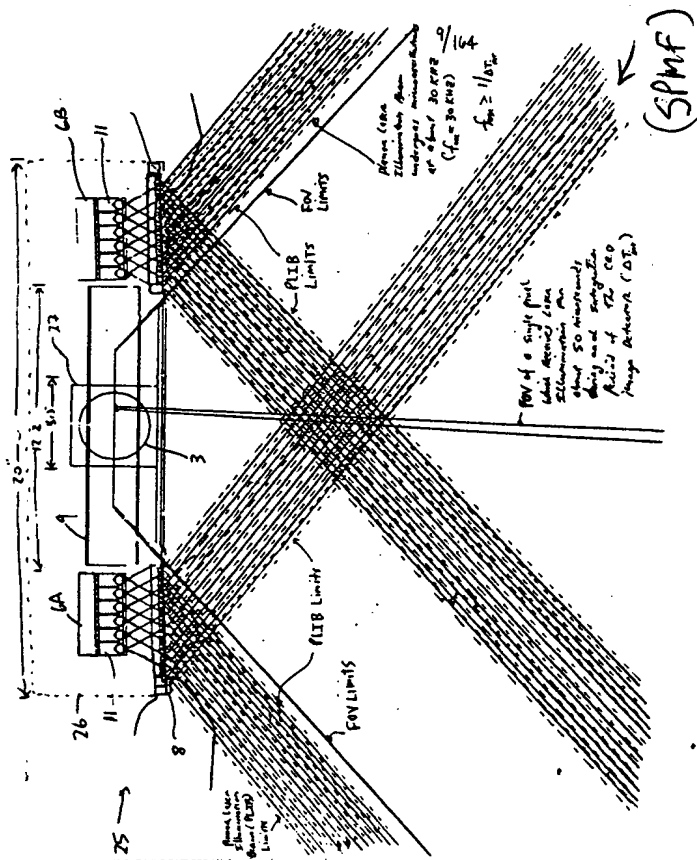


FIG. 1I1

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Prior to object illumination

FIG. 112A

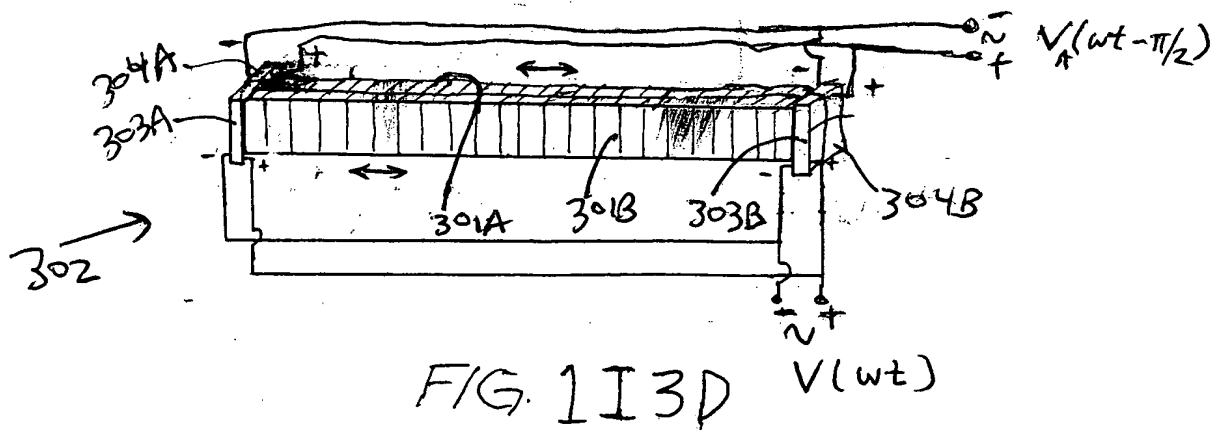
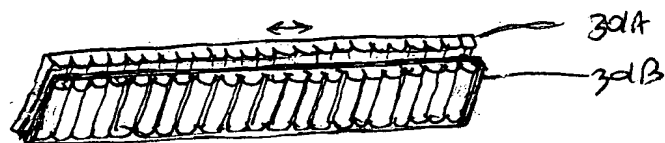
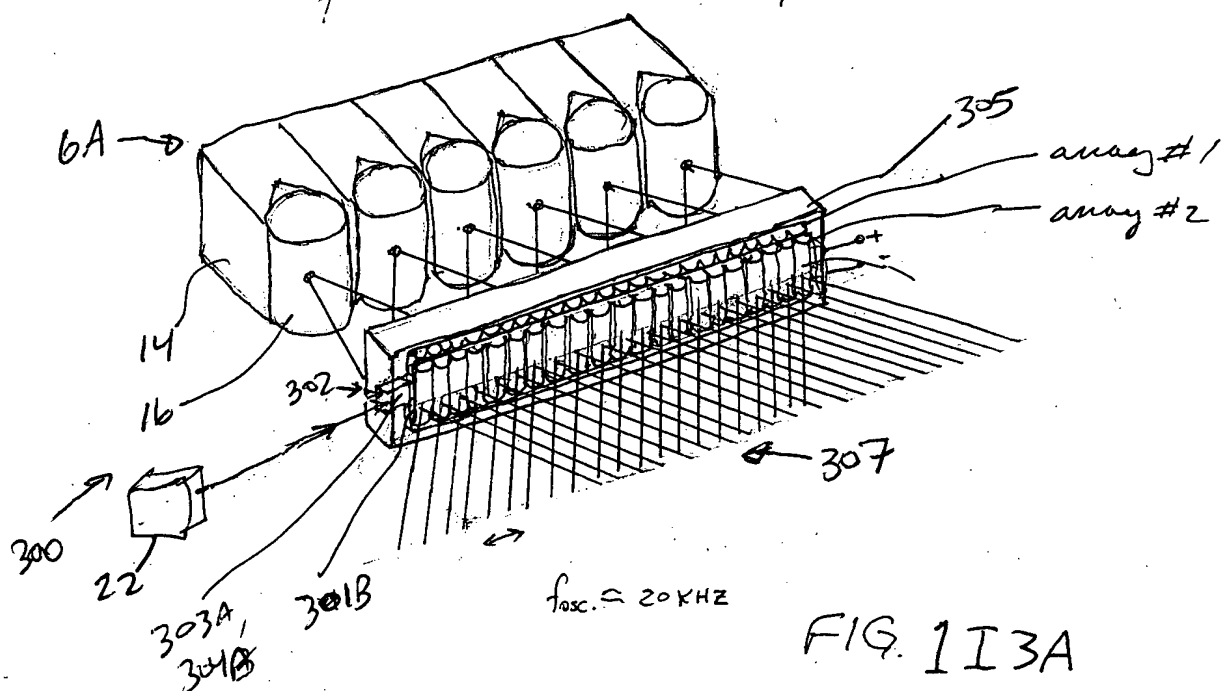
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**The First Generalized Speckle-Noise Pattern Reduction Method**  
**Of The Present Invention**

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial phase of the transmitted PLIB along the planar extent thereof according to a spatial phase modulation function (SPMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the power of the speckle-noise pattern observed at the image detection array.

FIG. 1I2B



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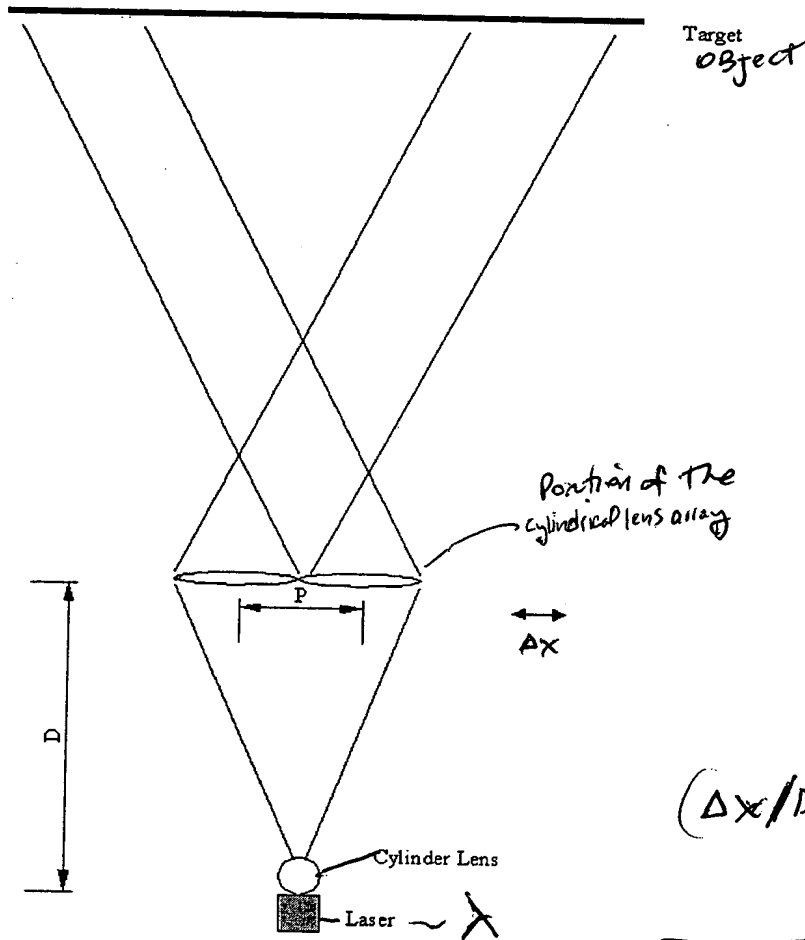


Figure 1

$$(\Delta x / D) P = \lambda$$

$$\Delta x \geq \frac{\lambda \cdot D}{P}$$

FIG. 1I3E



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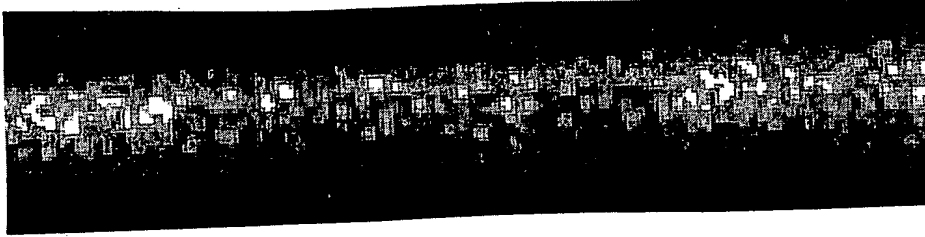


FIG. 1I3F

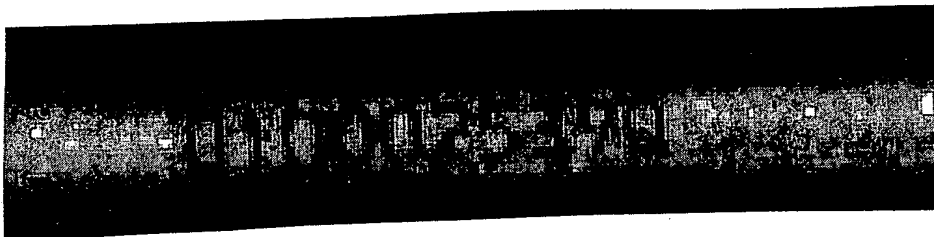
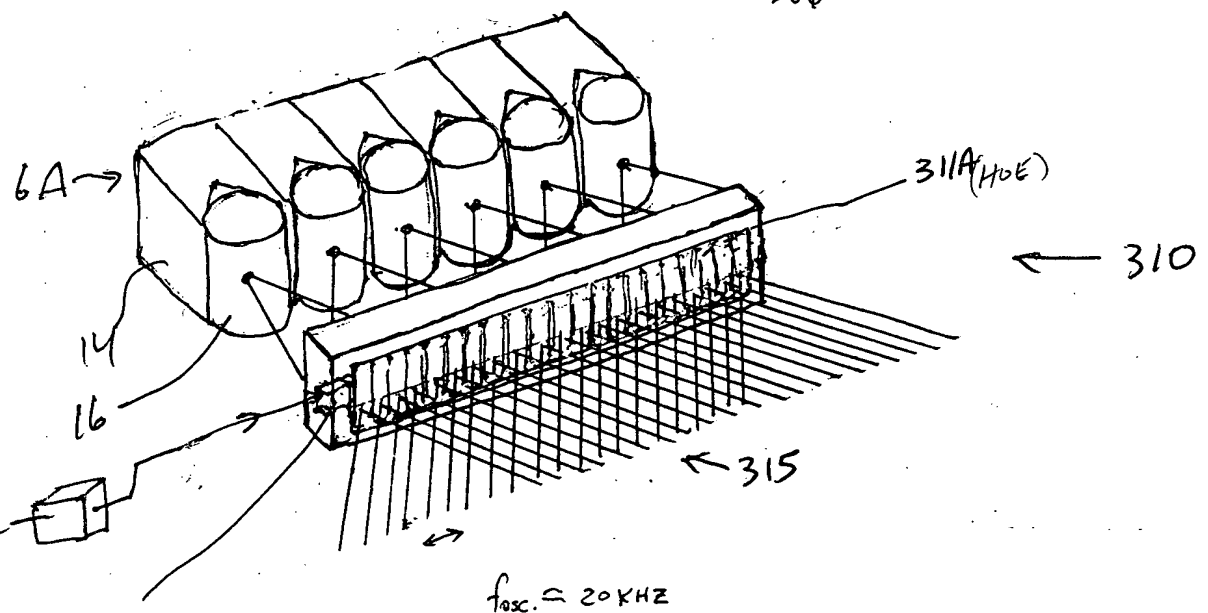


FIG 1I3G

00000130:051501

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$f_{osc} = 20 \text{ KHZ}$

FIG 1I4A

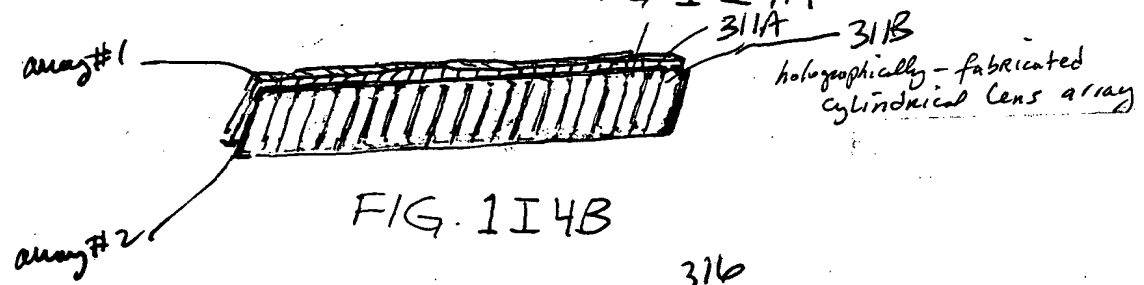


FIG. 1I4B

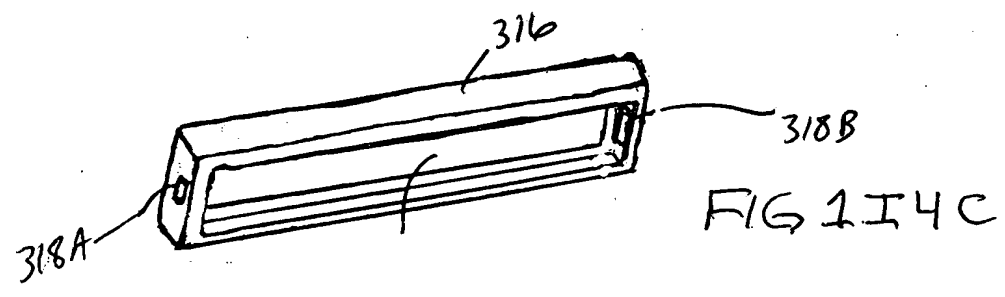


FIG 1I4C

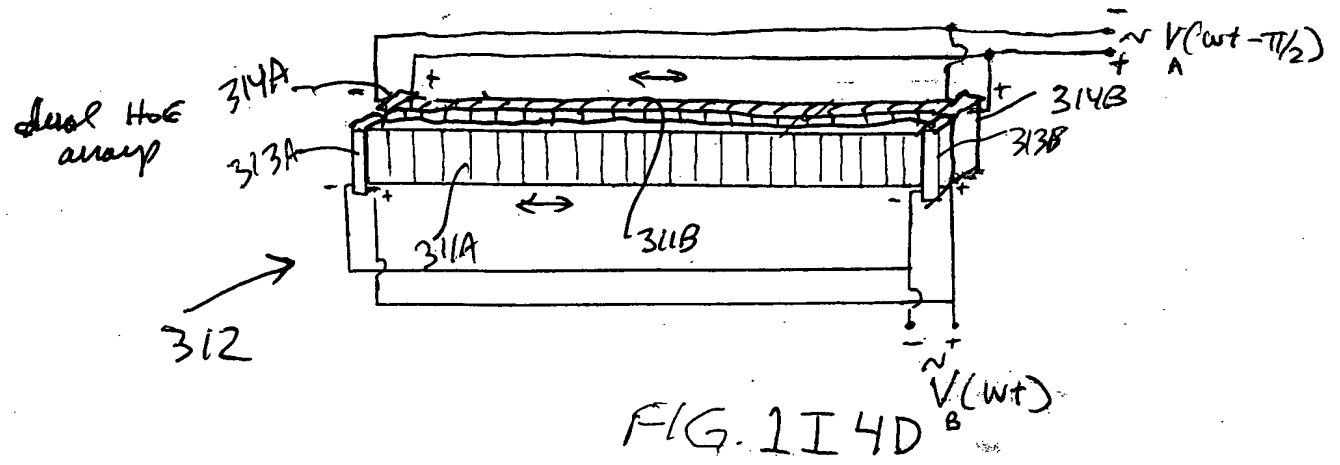


FIG. 1I4D

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09893130-061601  
TESTED-061601

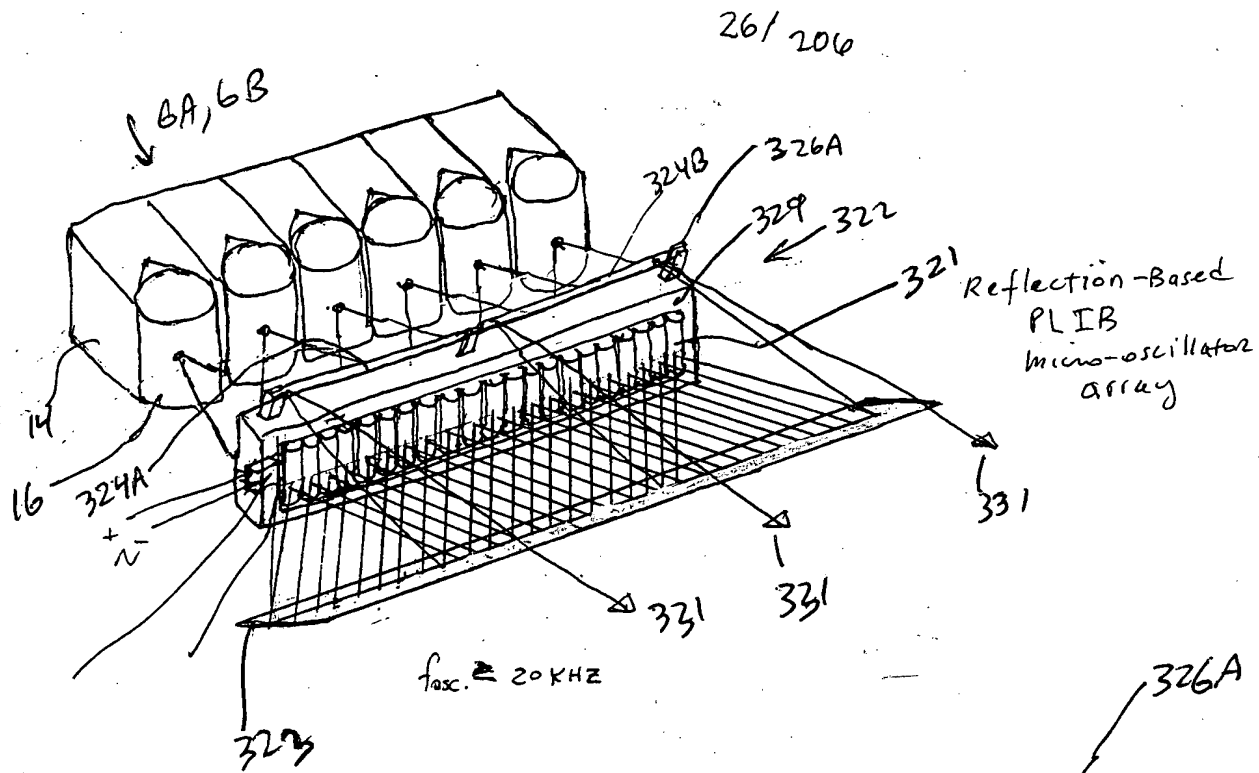


FIG. 1ISA

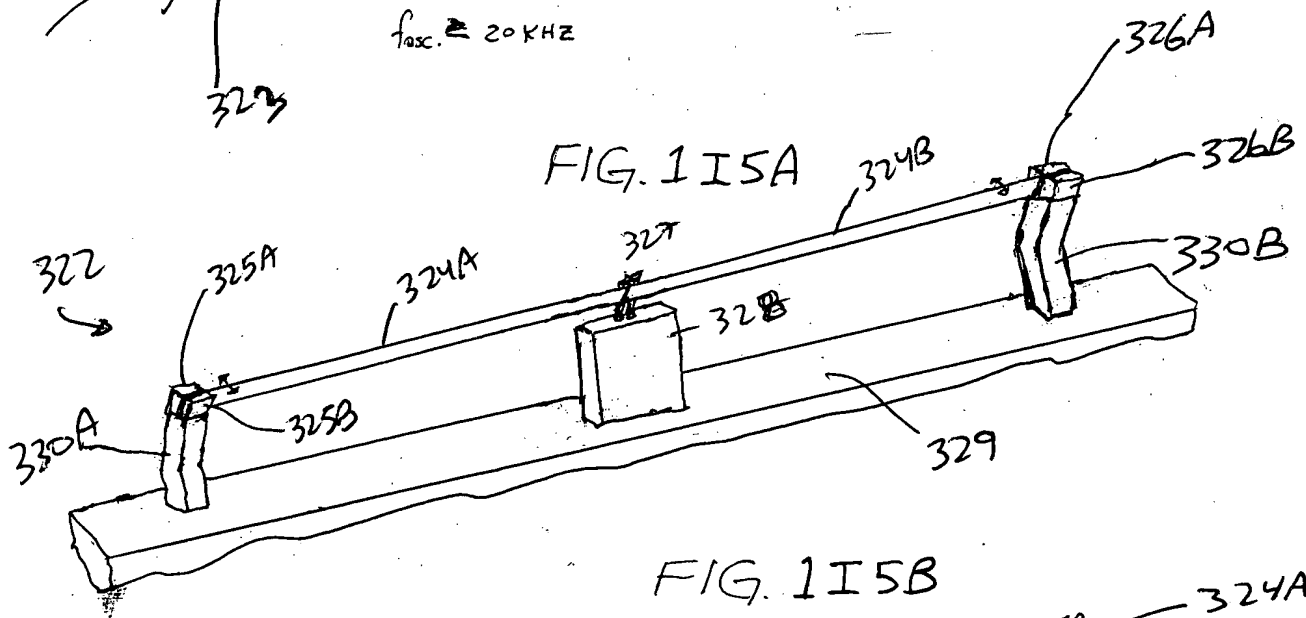


FIG. 1I5B

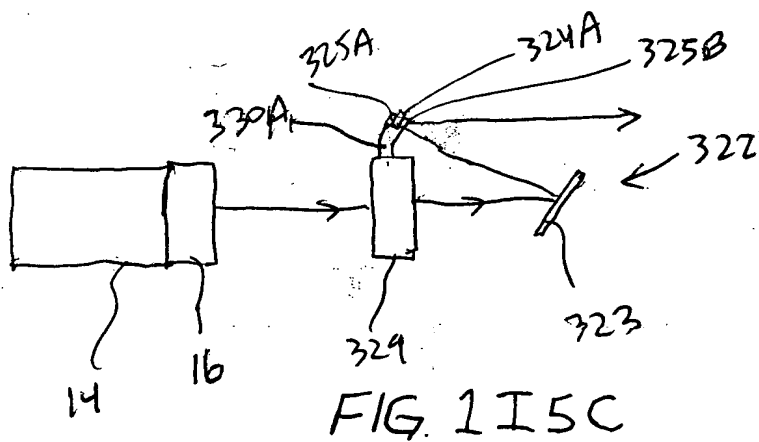


FIG. 1I5C

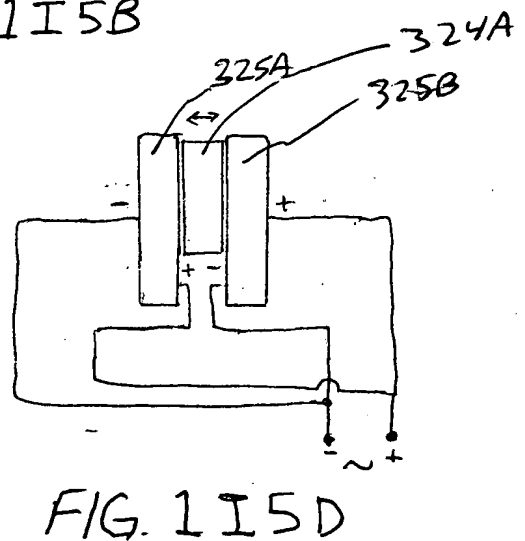
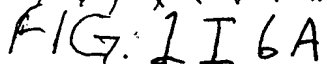
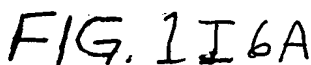
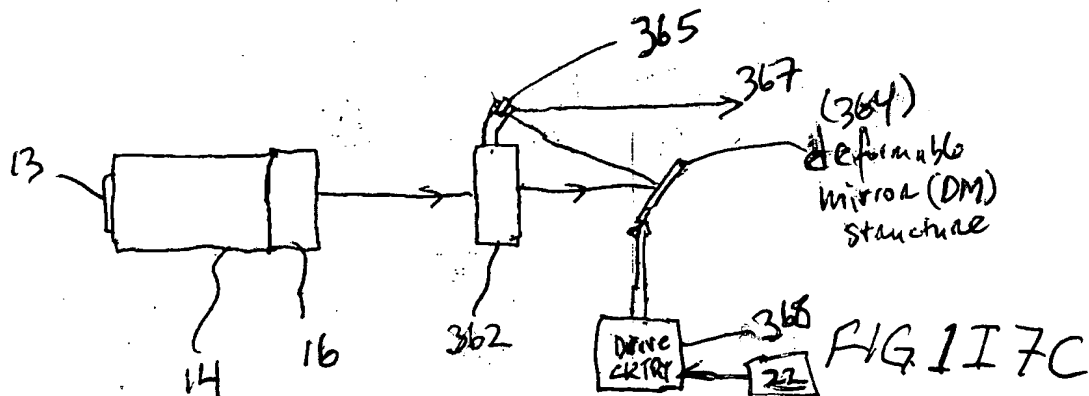
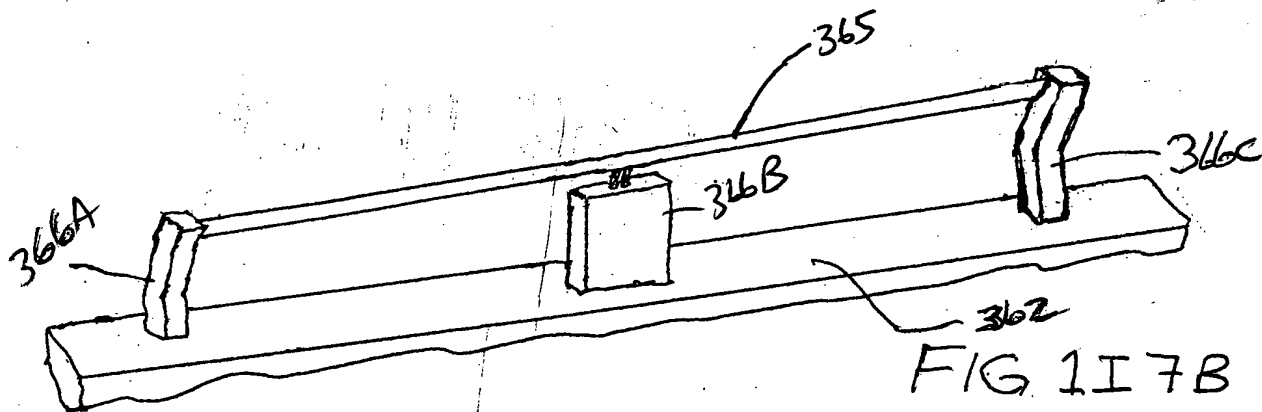
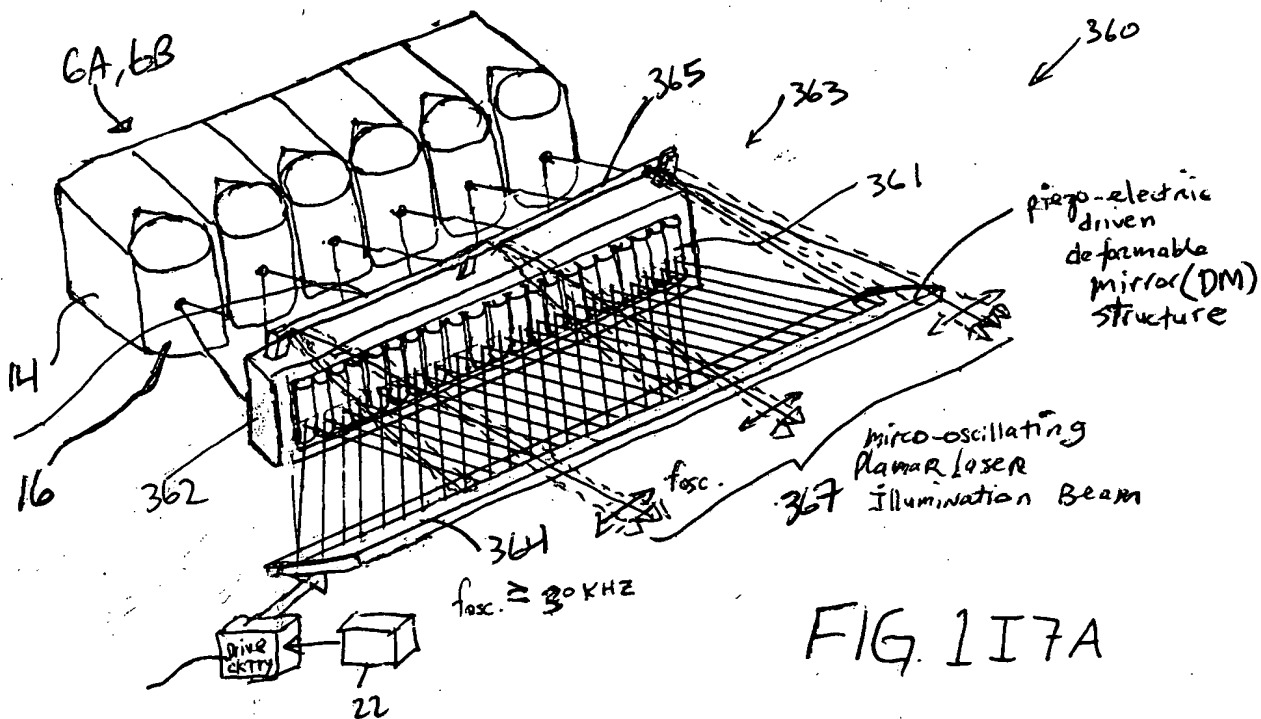


FIG. 1I5D



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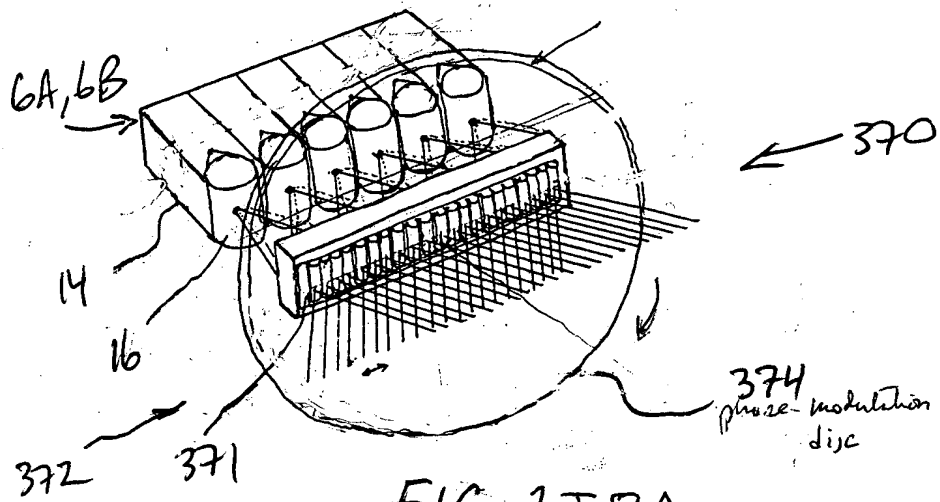


FIG. 1I8A

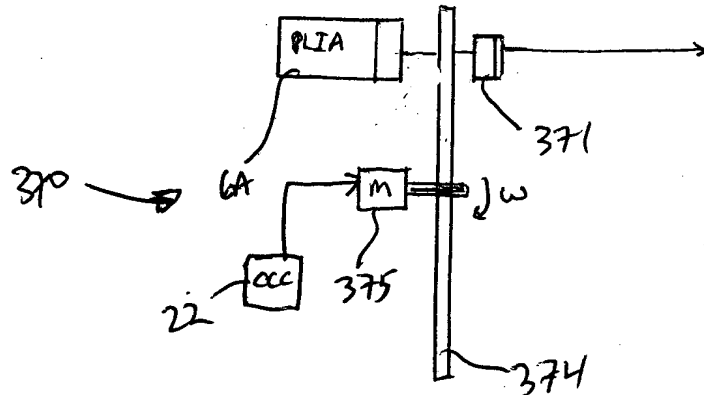


FIG. 1I8B

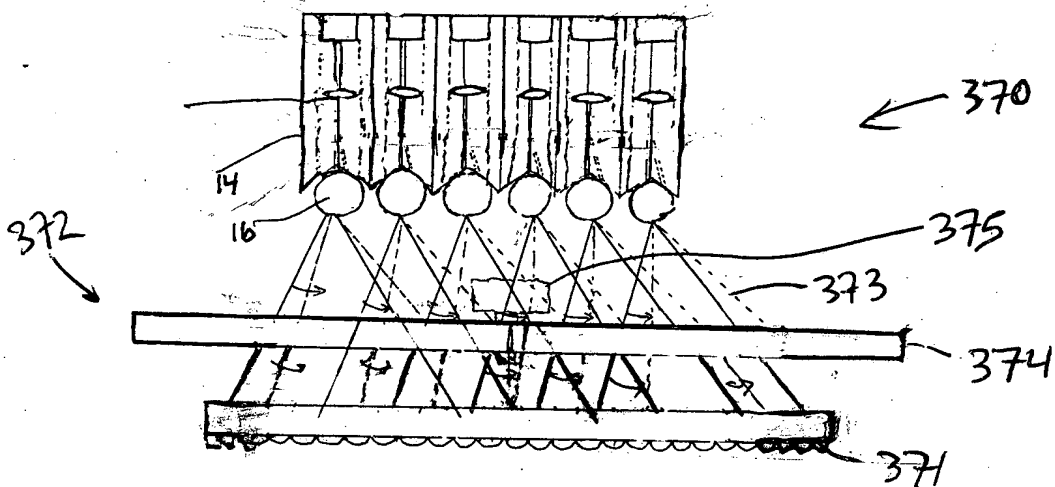


FIG. 1I8C

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105190-0225560

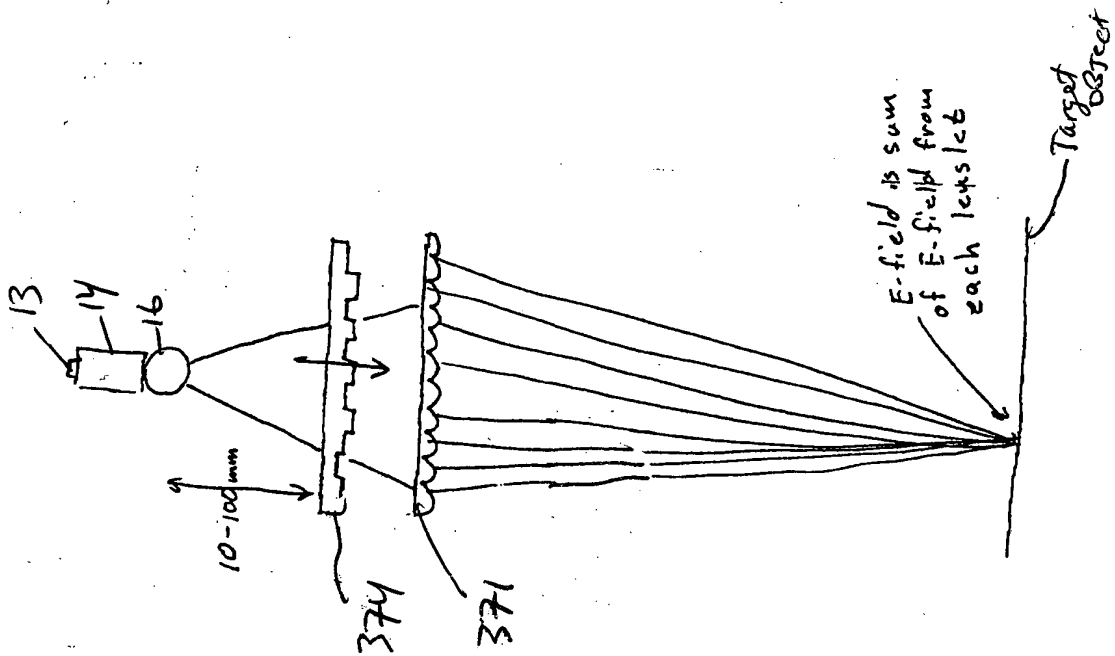


FIG 1I8E

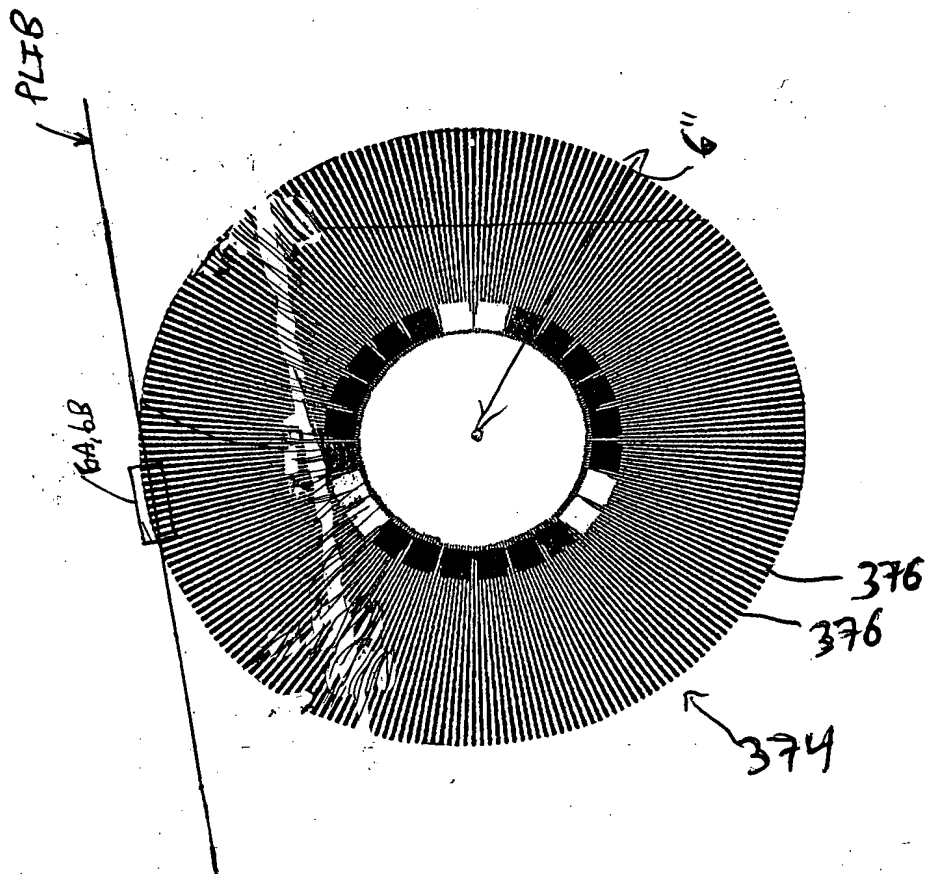


FIG 1I8D

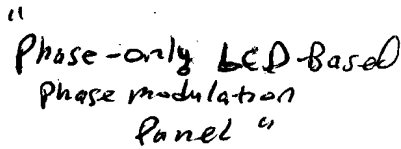
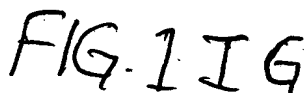


FIG. 118F





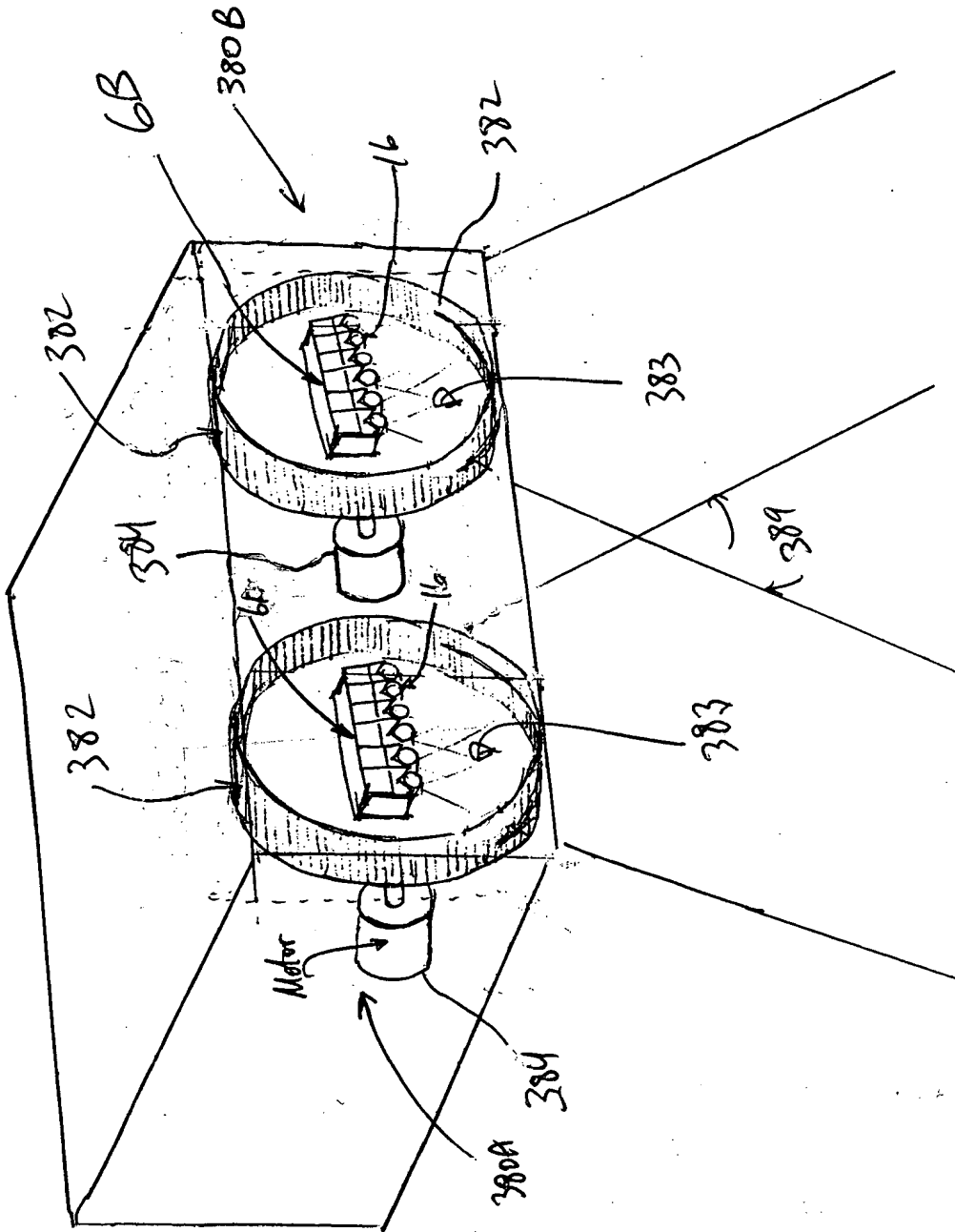


FIG. 119A

Optical specifications:

- 30 cylindrical lens (lens) per linear inch
- focal length: 2.0 millimeters
- diameter of lens carousel  $\approx 4$  inches
- acrylic material
- lens carousel elements on inside diameter

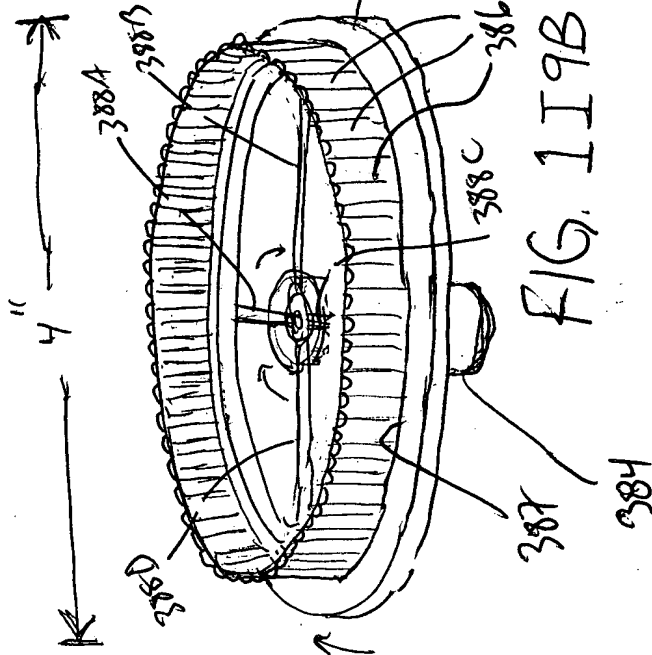


FIG. 1I9B

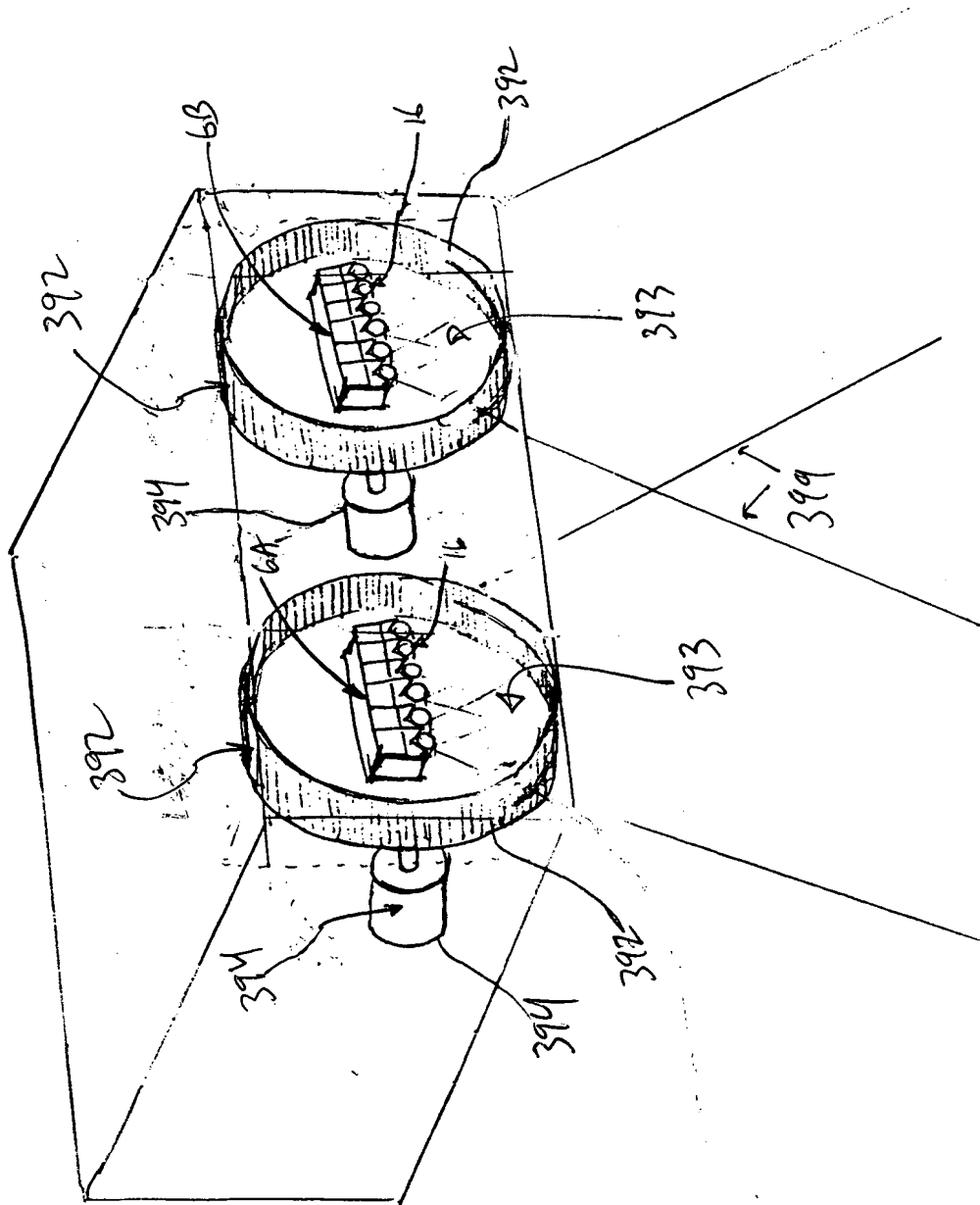
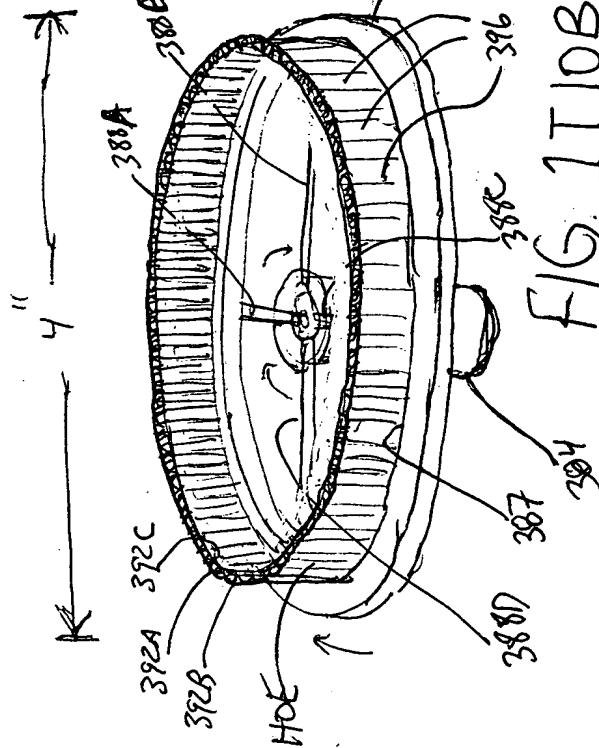


FIG. 1I10A

Optical Specifications:



- 30 cylindrical lens (lens) per linear inch
- focal length: 2.0 millimeters
- diameter of cylindrical carousel  $\approx 4$  inches
- acrylic material
- cylindrical cylindrical elements on inside diameter

FIG. 11A

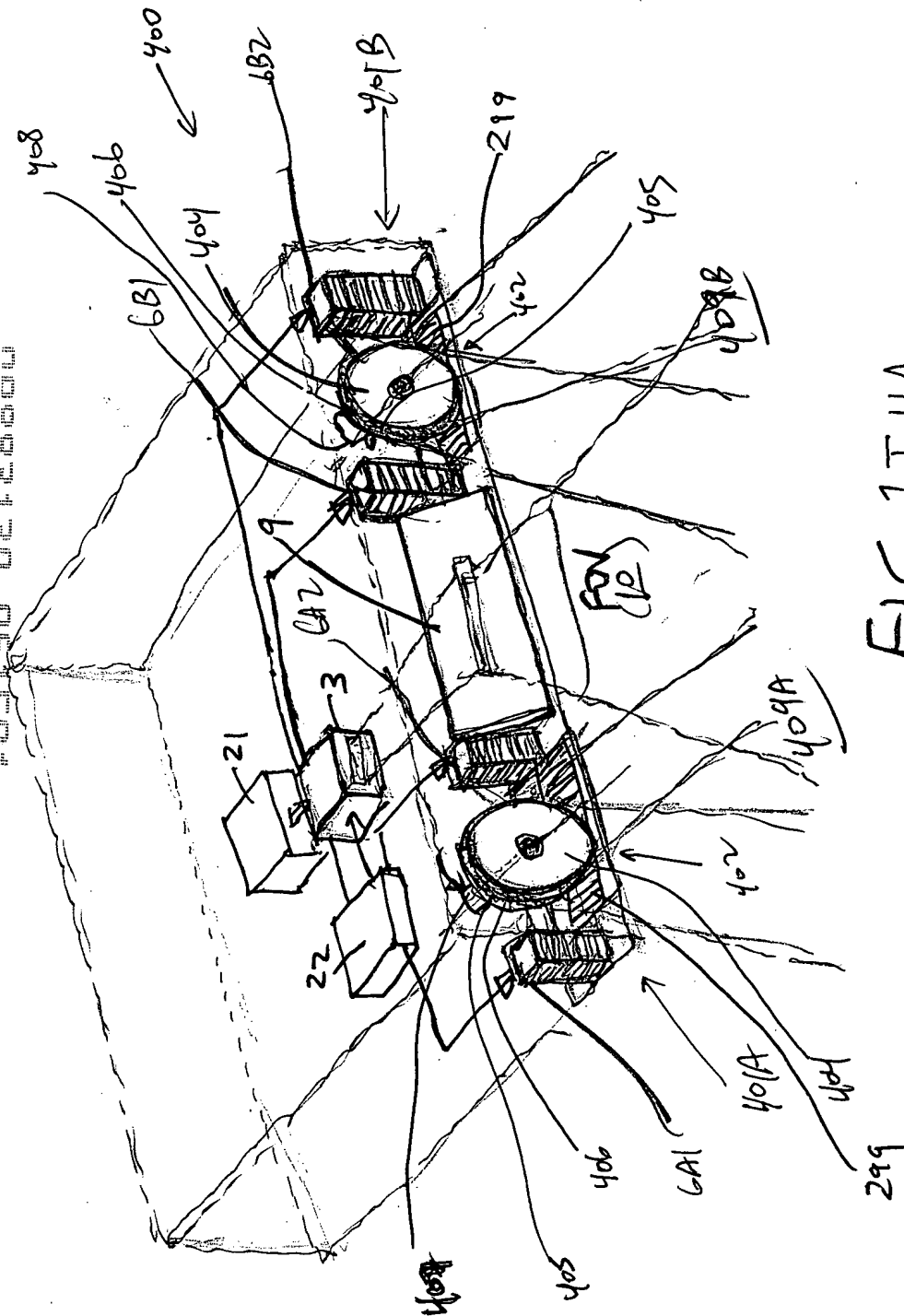


FIG. 11A

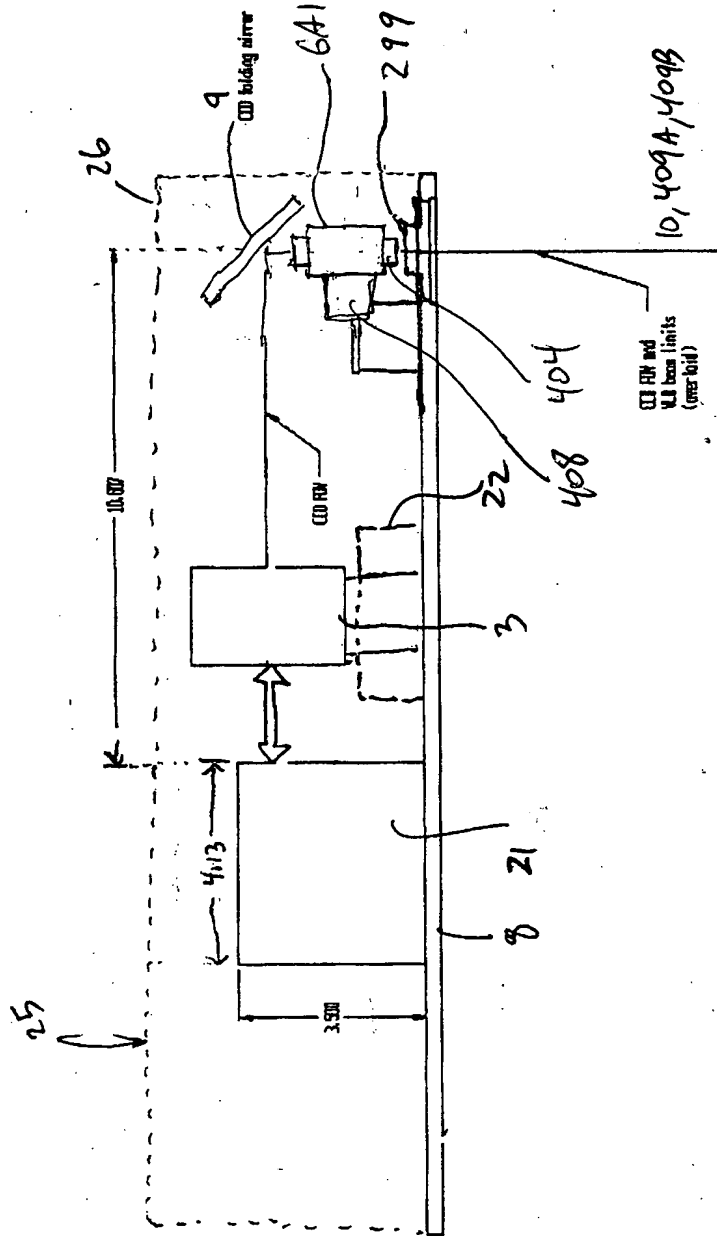


FIG 1I1B

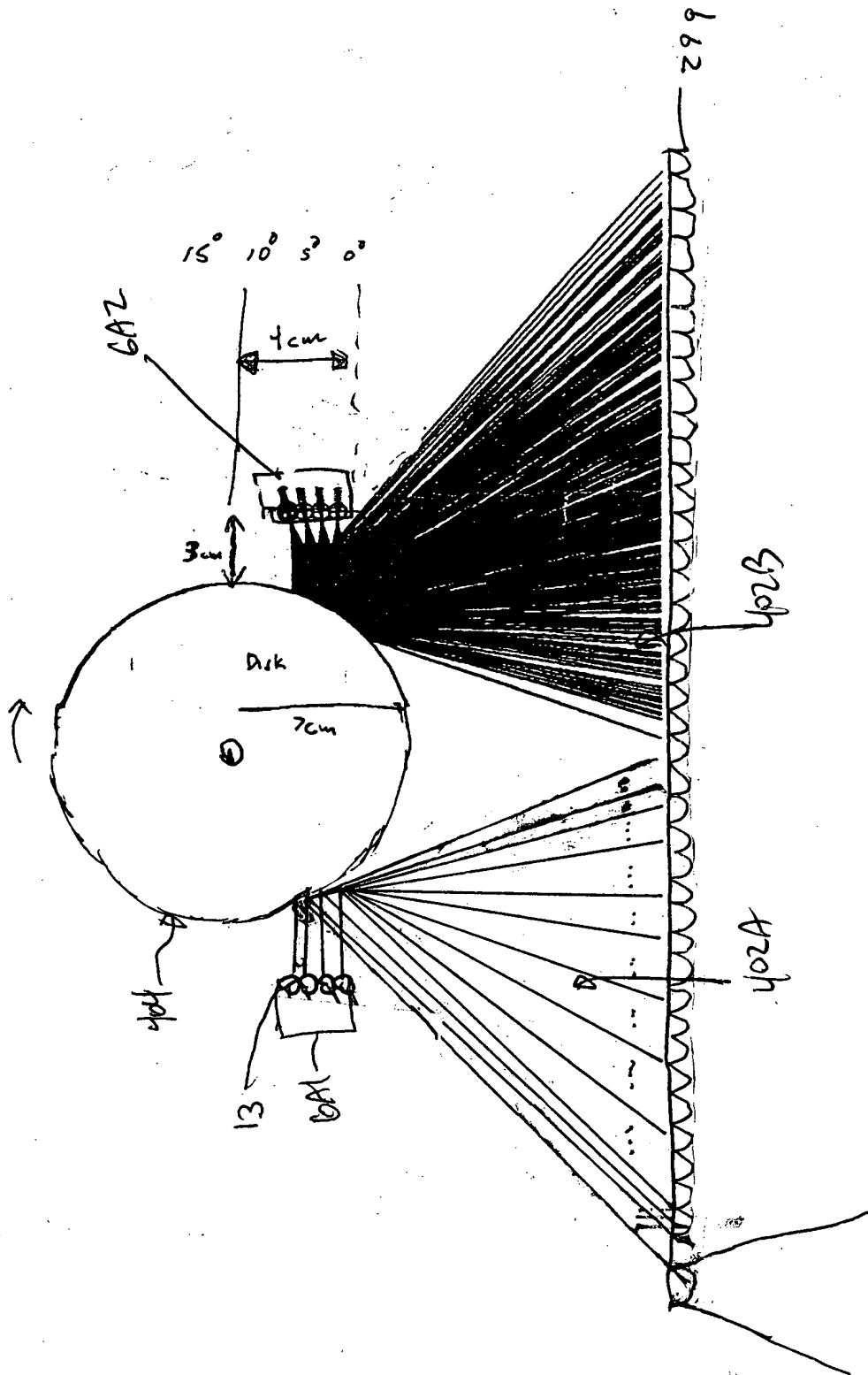


FIG. 11C

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Second Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the FFD Subsystem (3)

(TIME)

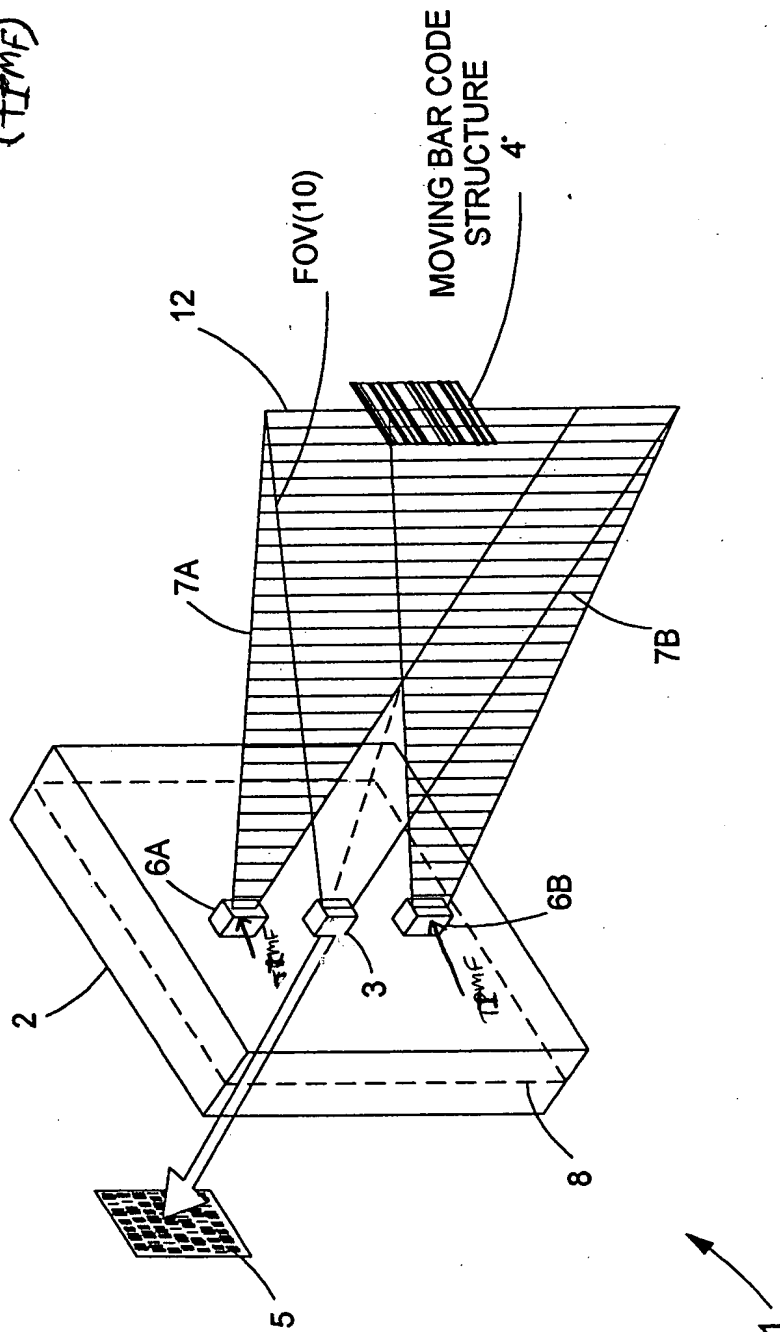


FIG. 1 I / 2



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00003430-061504

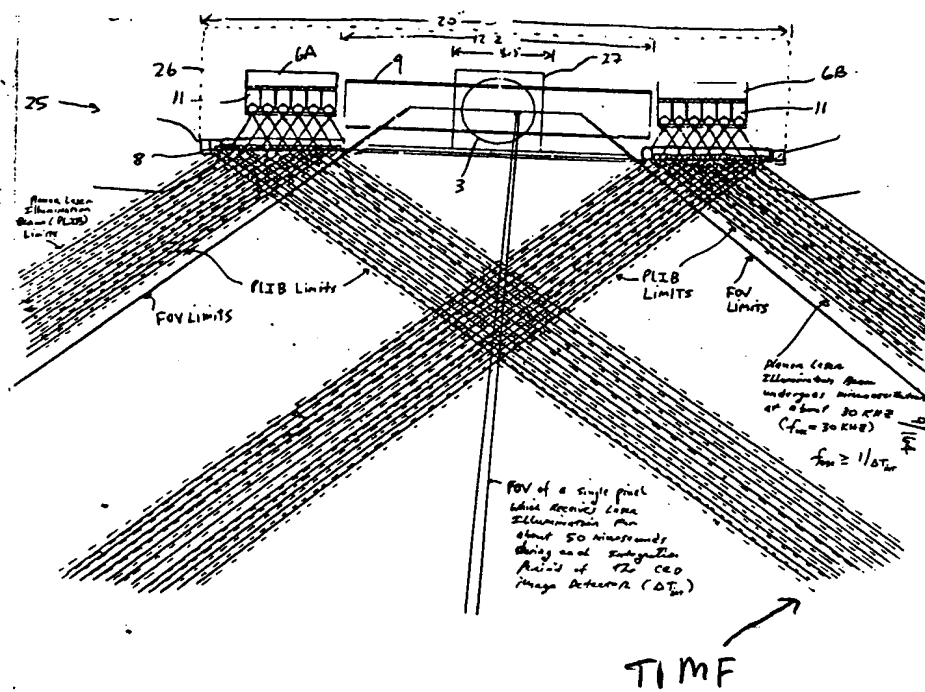


FIG. 1 I 13A

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**The Second Generalized Speckle-Noise Pattern Reduction Method**  
**Of The Present Invention**

Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the transmitted PLIB along the planar extent thereof according to a temporal intensity modulation function (TIMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

A

Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.

B

FIG. 1I/3B

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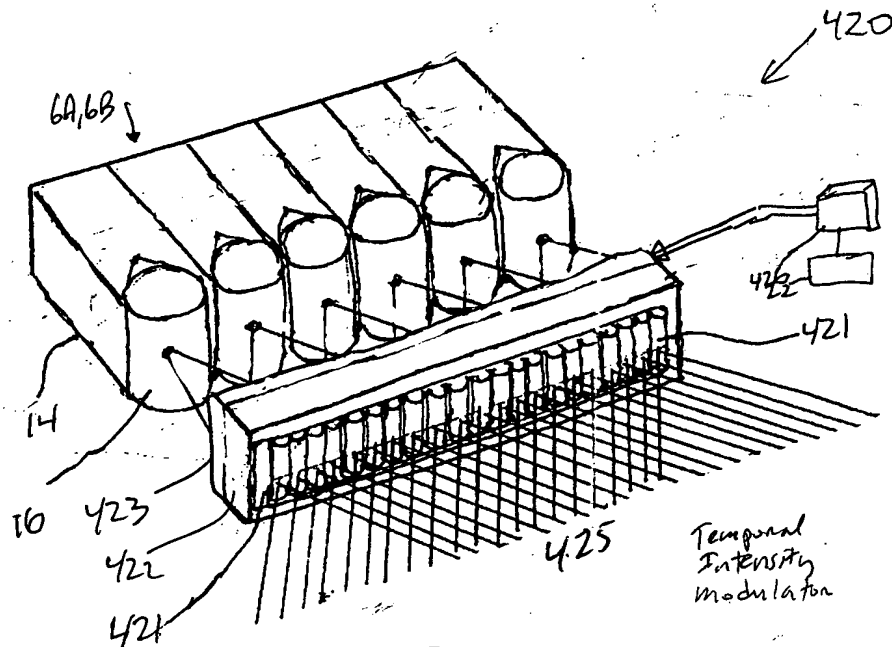


FIG. 1I14A

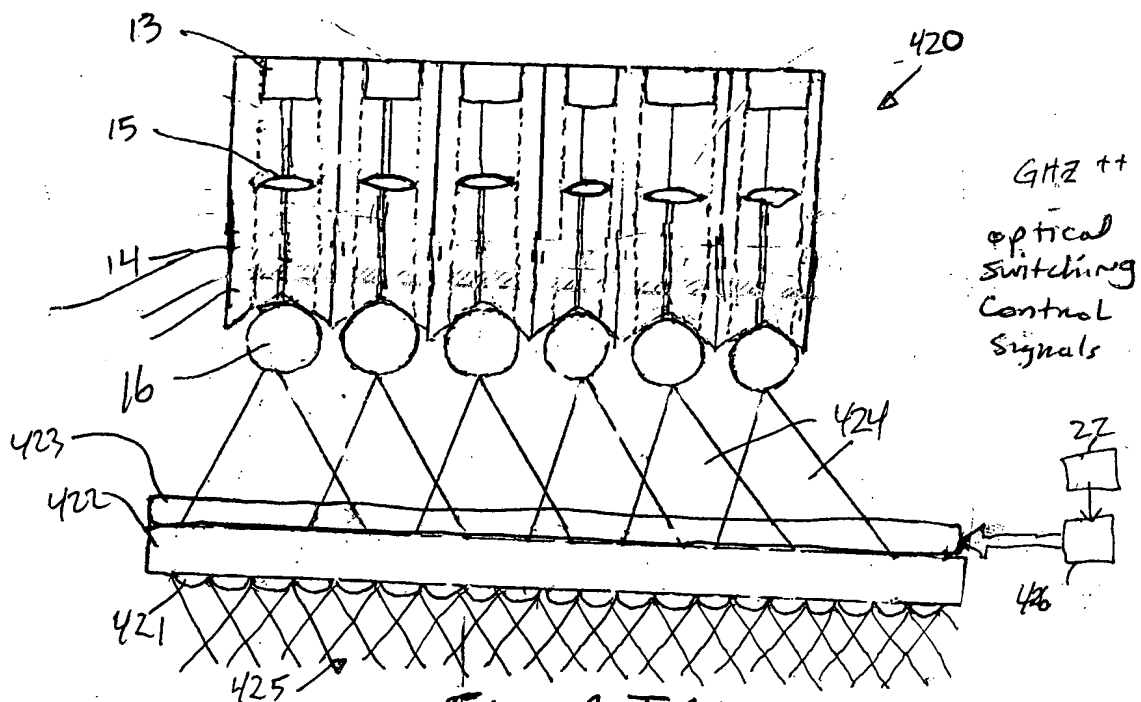


FIG. 1I14B

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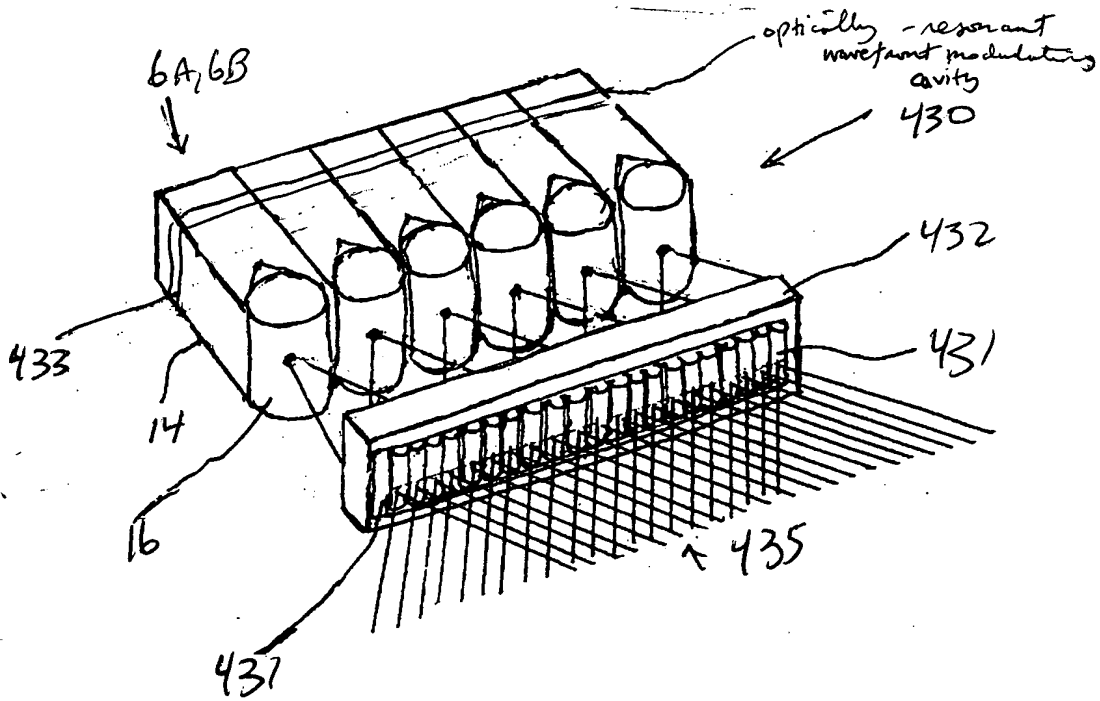


FIG. 1I15A

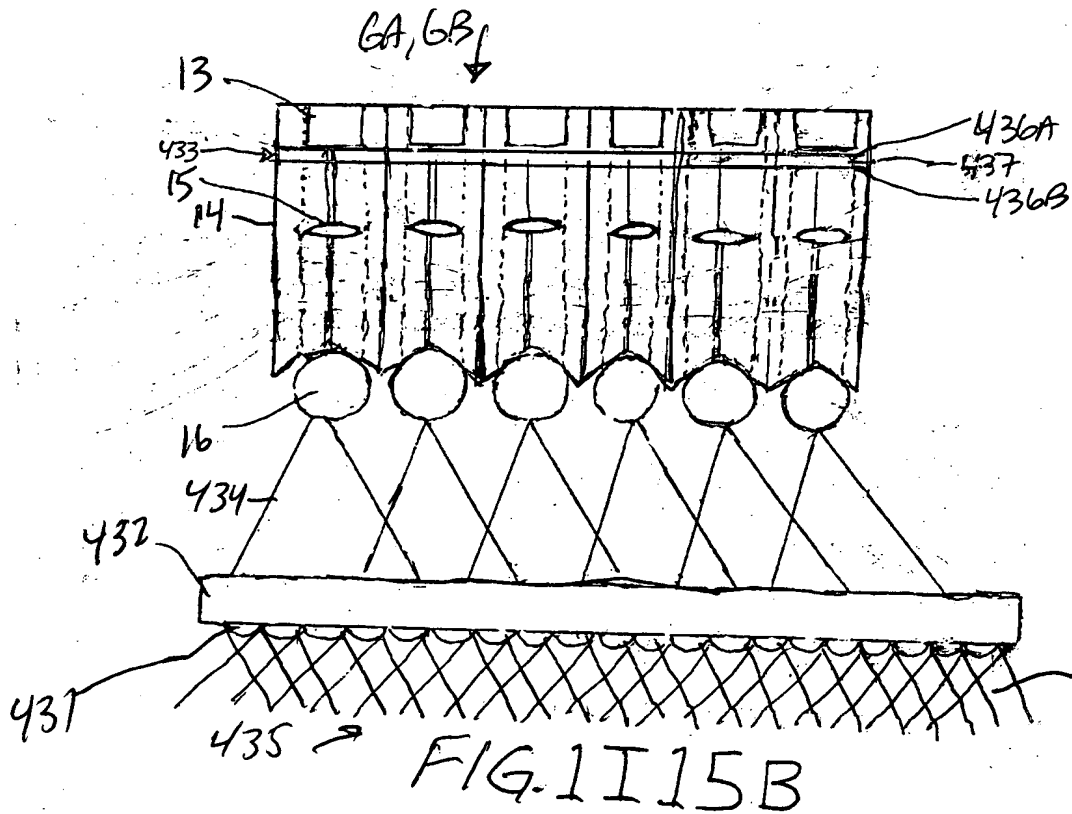
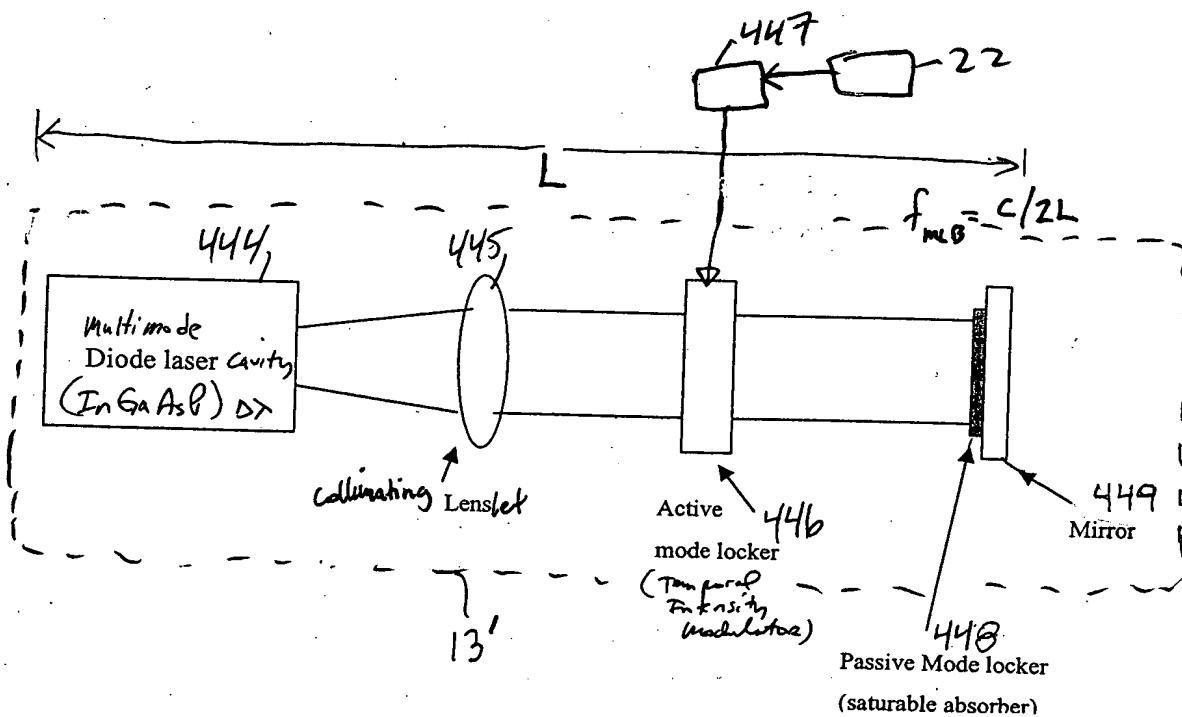
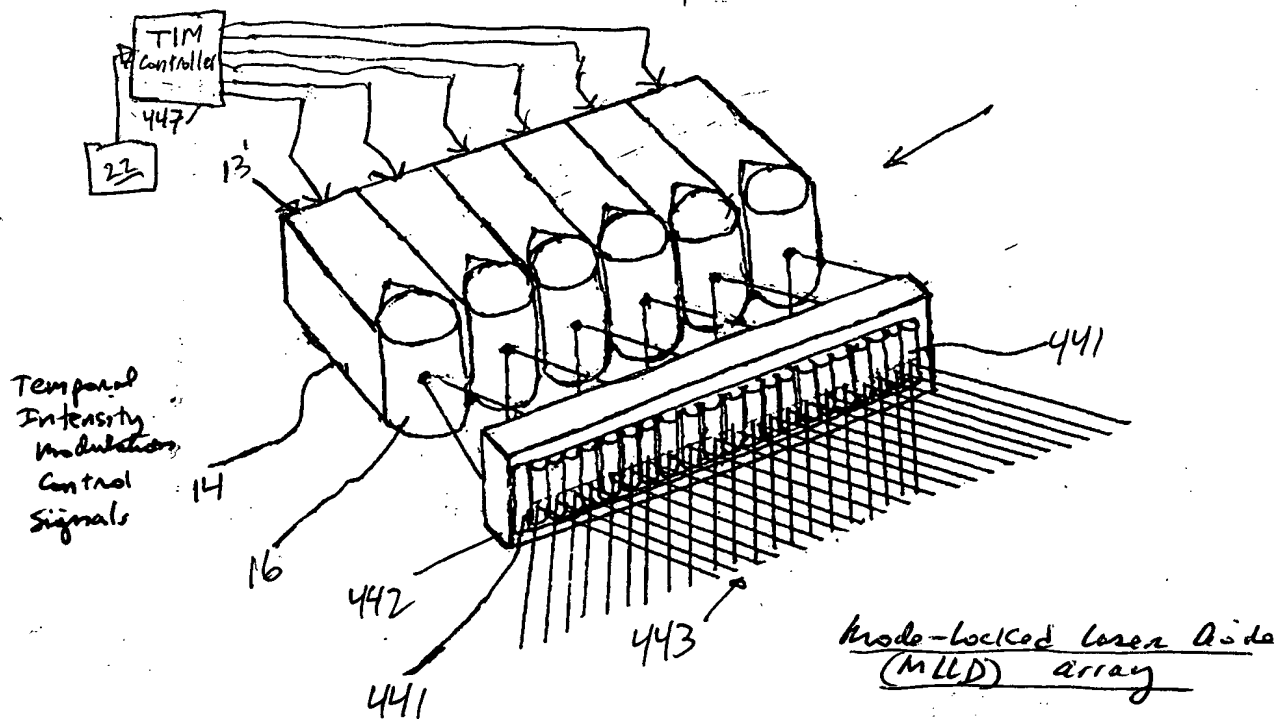


FIG. 1I15B

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00000130-061501

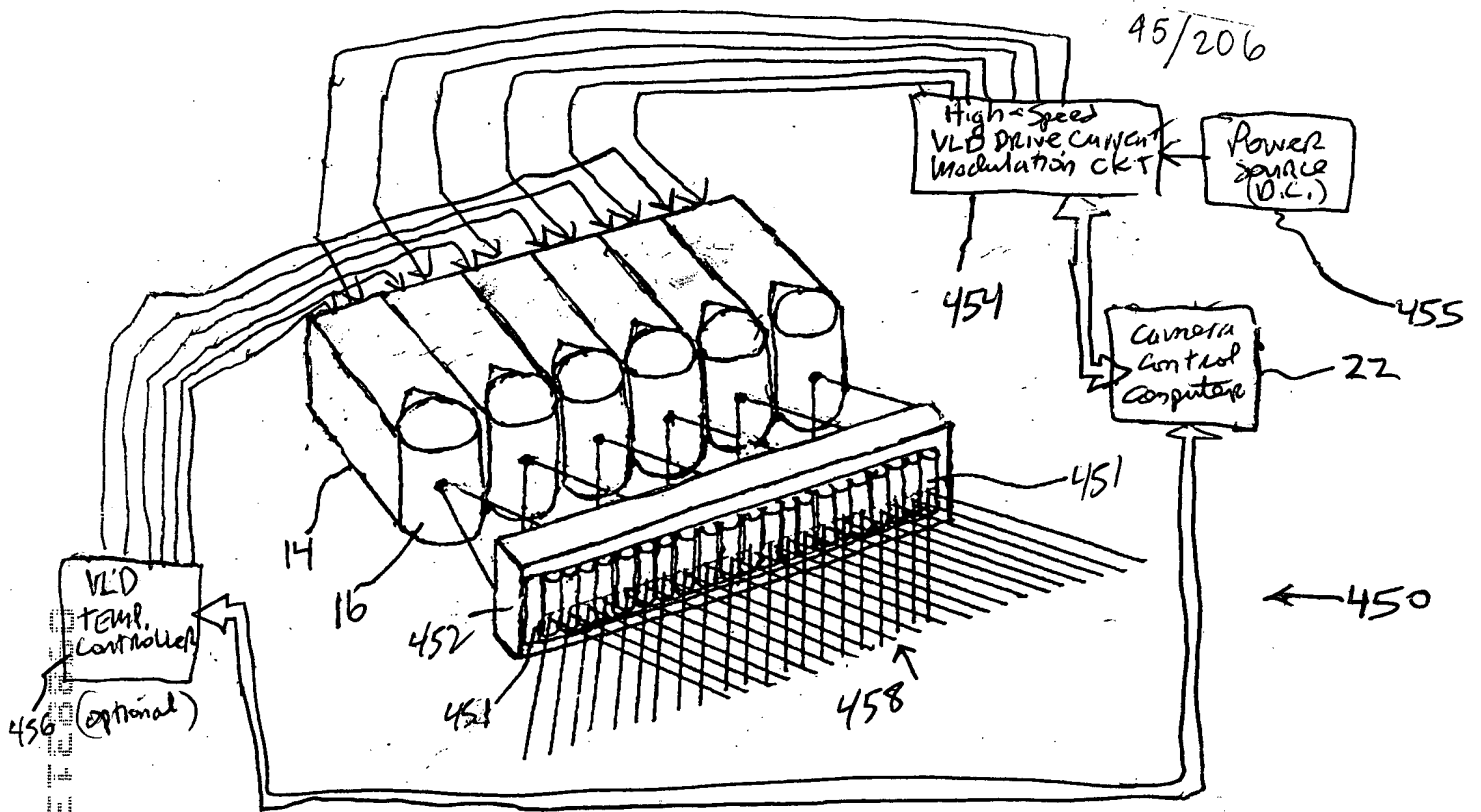
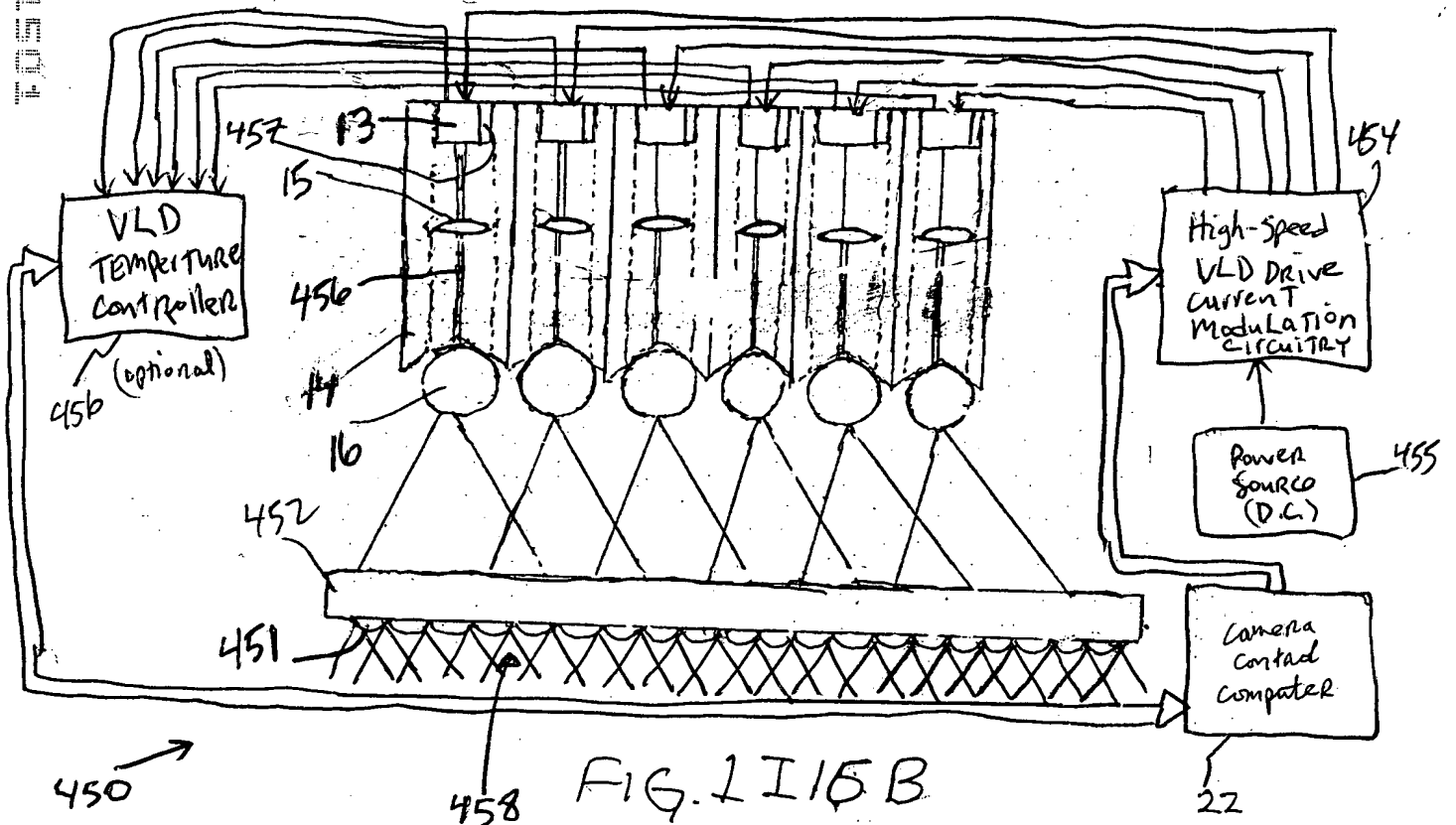


FIG. 1I16A



Third GENERALIZED METHOD  
of Reducing Speckle-Noise  
PATTERNS AT IMAGE  
Detection array OF THE  
FFD subsystem (3)

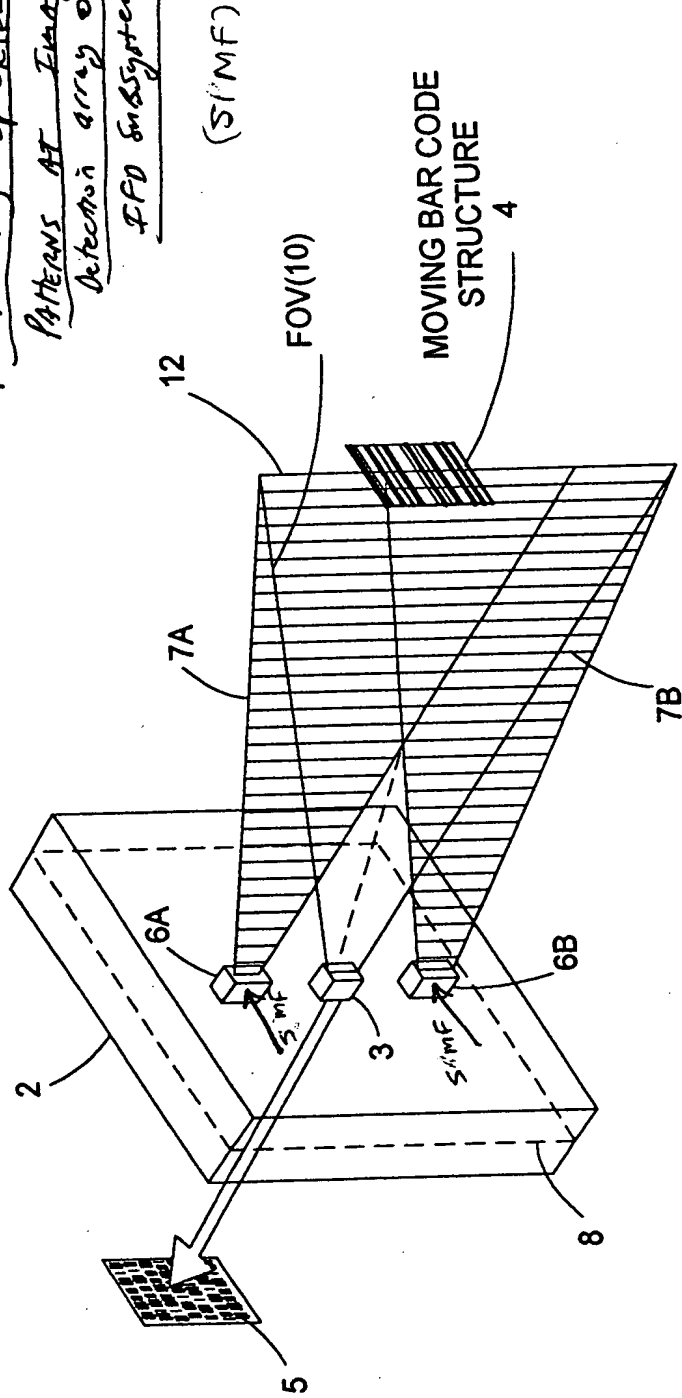


FIG 1E17

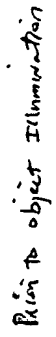


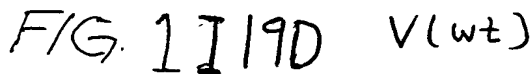
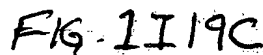
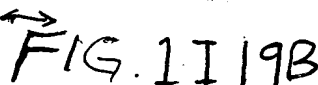
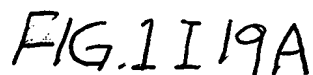
FIG 1 IBA



**Prior to illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the transmitted PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to modulate the phase along the wavefront of the transmitted PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.**

**Temporally average the numerous substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce power of the speckle-noise pattern observed at the image detection array.**

FIG. 1I18B



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Fourth Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of the IFD Subsystem

(SIMF)

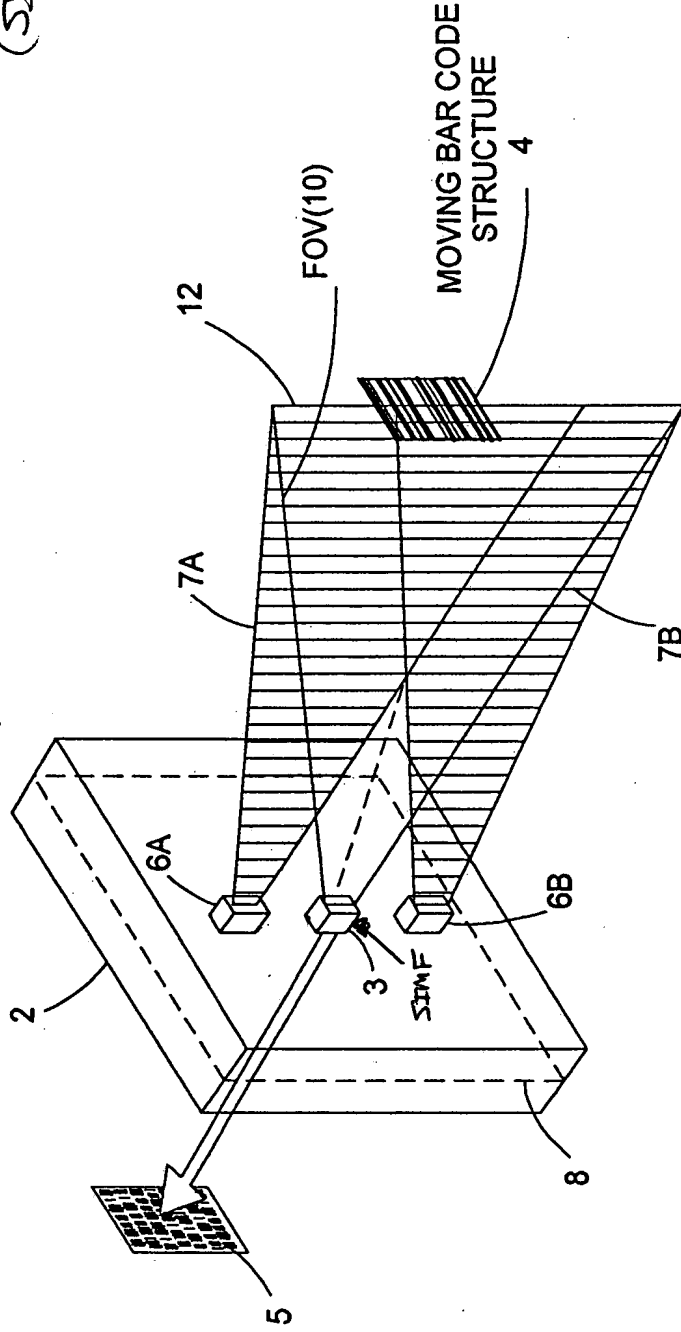


FIG. 1120

**THE**  
**NEW**  
**YORK**  
**PUBLIC**  
**LIBRARY**



FIG. II 21A

The ~~Fourth~~ Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the spatial intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a spatial intensity modulation function (SIMF) so as to modulate the phase along the wavefront of the received PLIB and produce numerous substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof. A

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array. B

FIG. 1I21B

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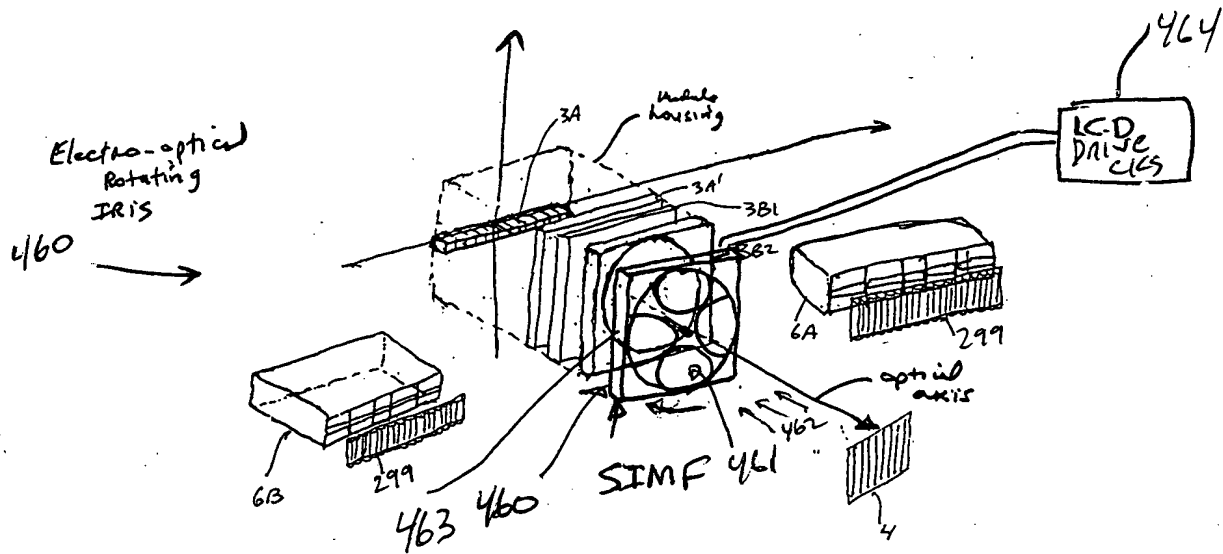


FIG. 1I 22A

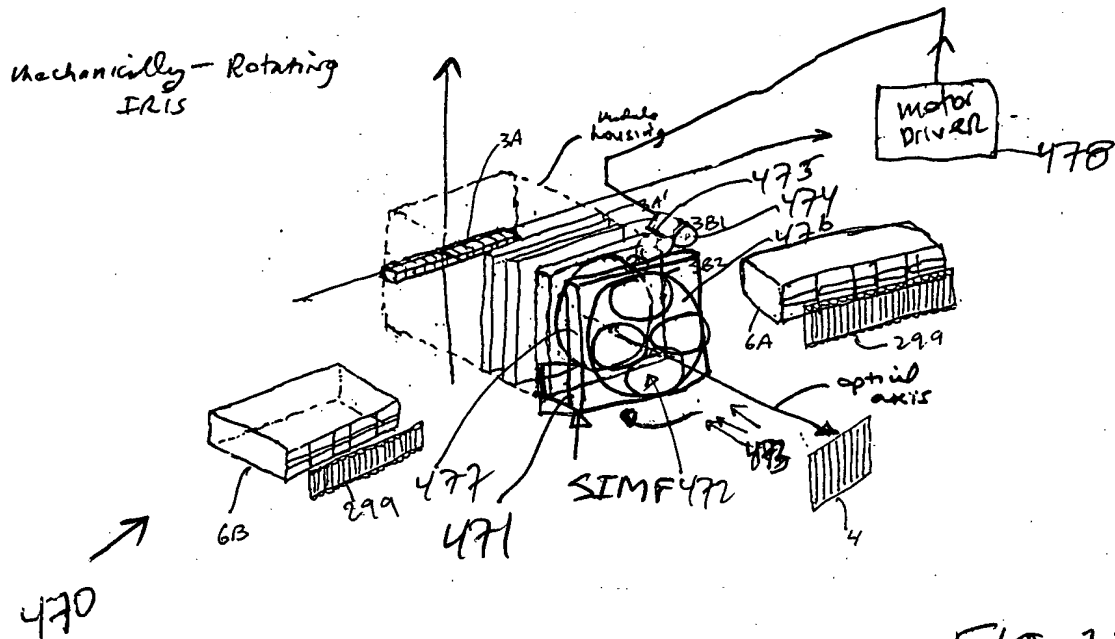


FIG. 1I 22B

00000000-00000000

Fourth Generalized Method of  
Reducing Speckle-Noise Patterns  
at Image Detection Array  
of IR IFD Subsystem

(TIME)

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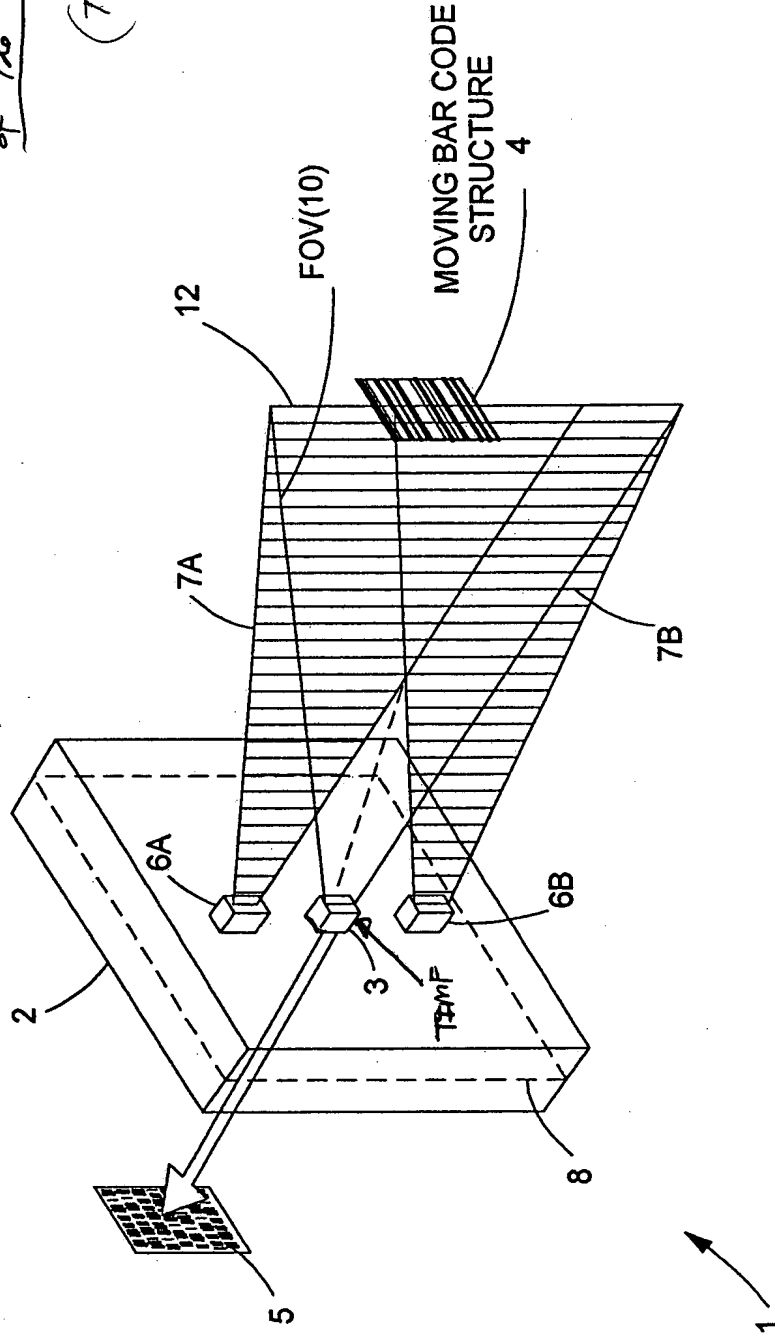


FIG. 1123

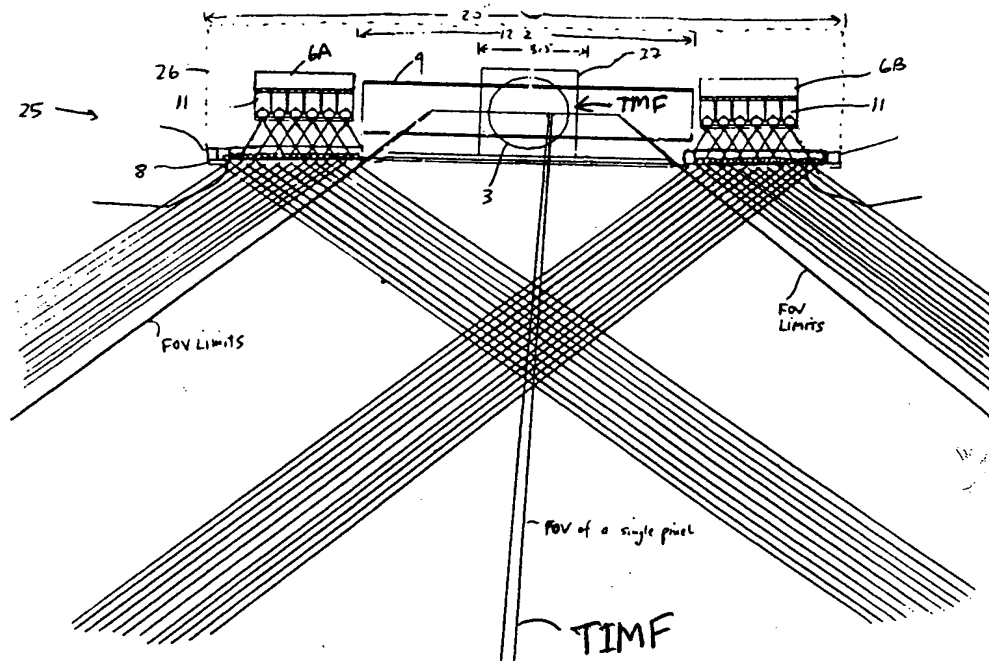


FIG. 1I24A



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The Fifth Generalized Speckle-Noise Pattern Reduction Method  
Of The Present Invention

After illumination of the target with the planar laser illumination beam (PLIB), modulate the temporal intensity of the reflected/scattered (i.e. received) PLIB along the planar extent thereof according to a temporal intensity modulation function (TIME) so as to modulate the phase along the wavefront of the received PLIB and produce many substantially different time-varying speckle-noise patterns at the image detection array of the IFD Subsystem during the photo-integration time period thereof.

Temporally average the many substantially different time-varying speckle-noise patterns produced at the image detection array in the IFD Subsystem during the photo-integration time period thereof, so as to thereby reduce the speckle-noise pattern observed at the image detection array.

FIG. 1I 24B

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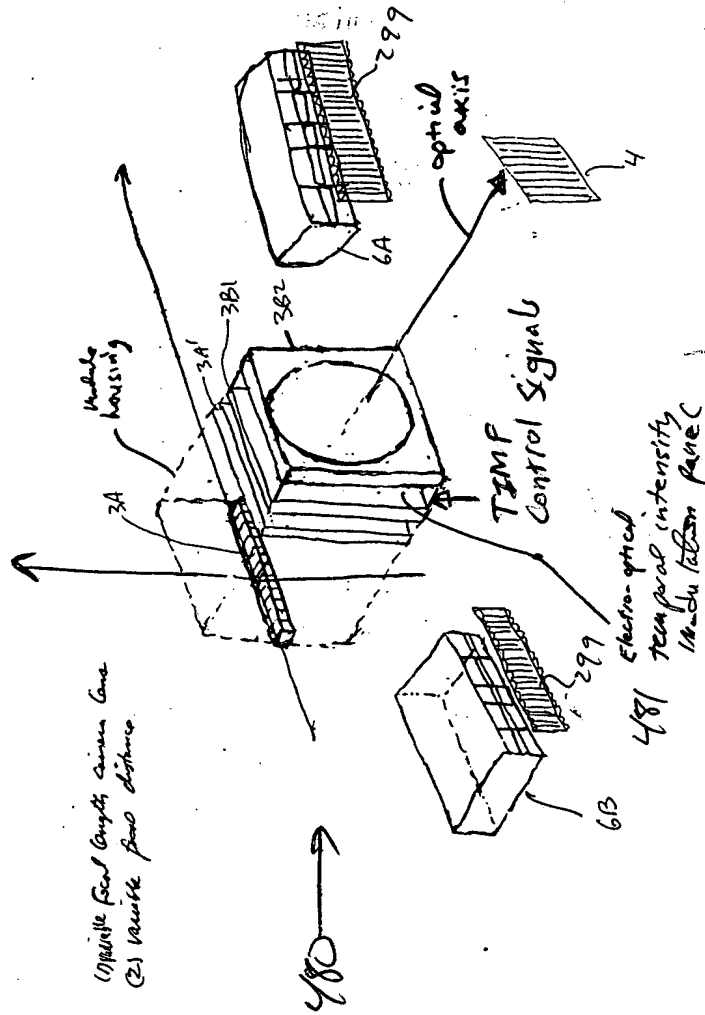


FIG. 11

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Fixed focal length lens  
cases

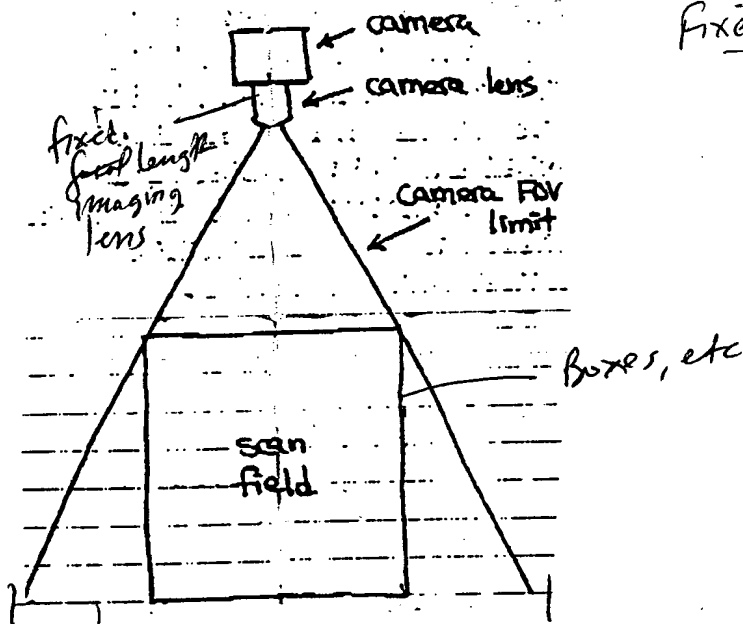


FIG. 1K1  
conveyor 34

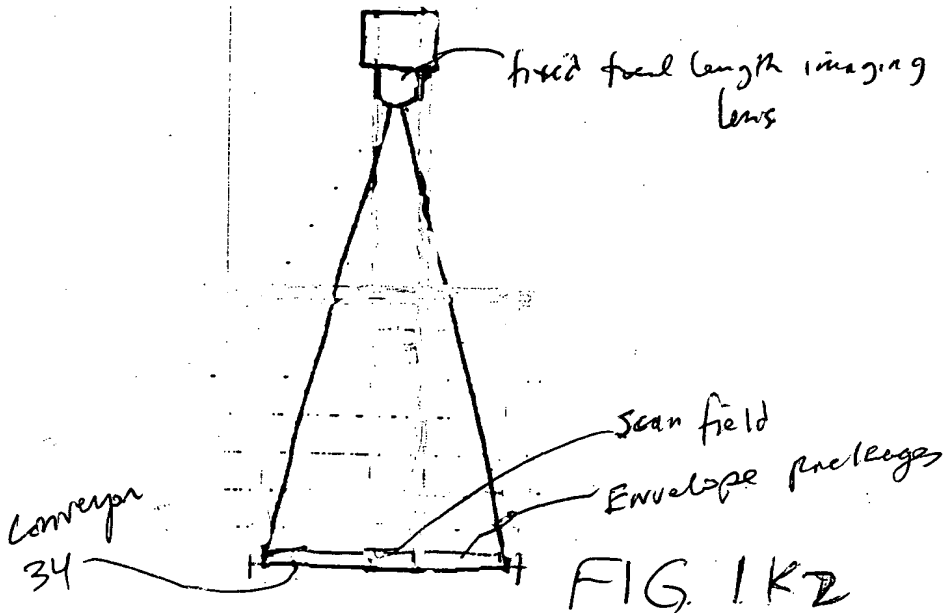


FIG. 1K2

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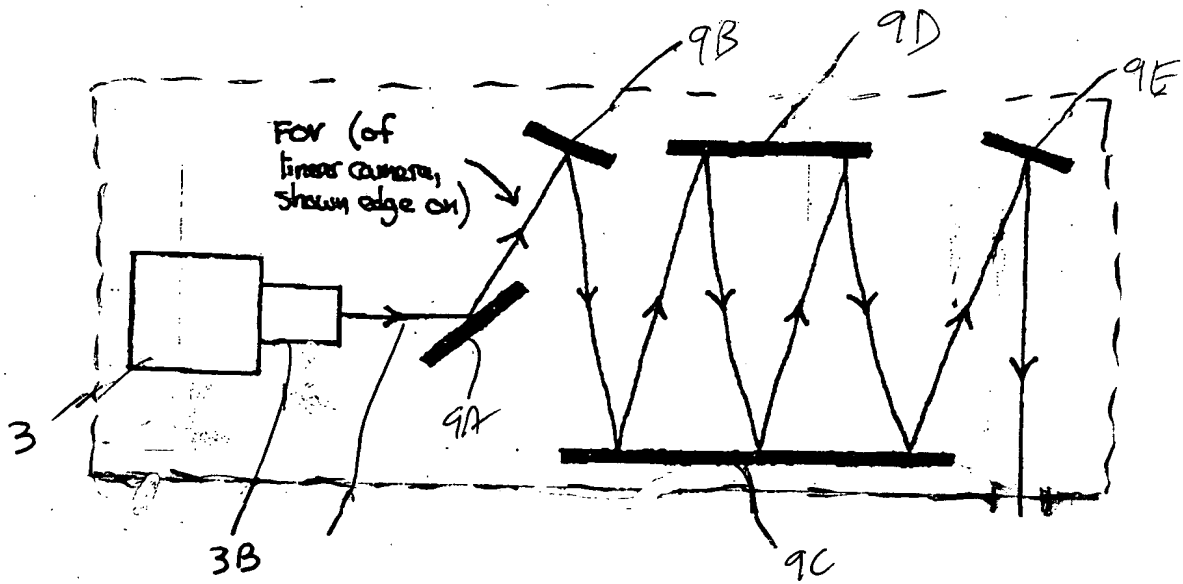


FIG. 1L1

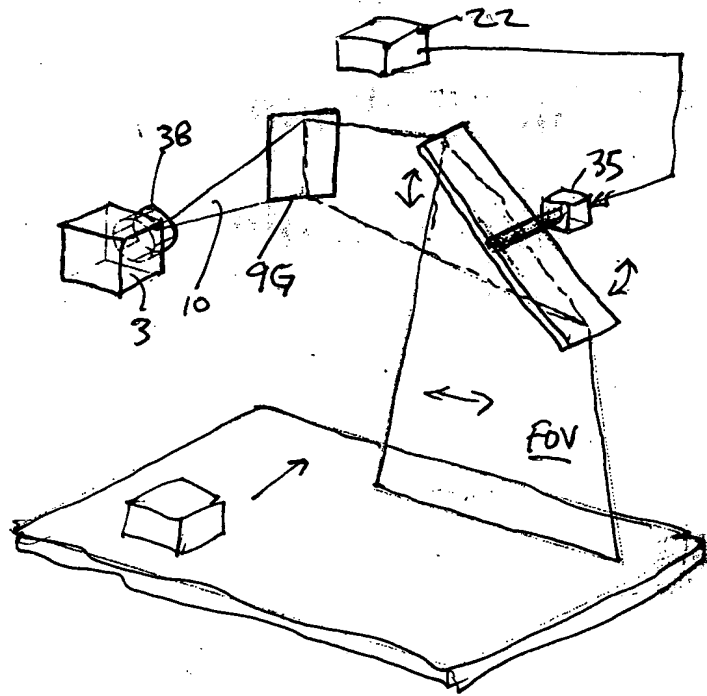


FIG. 1L2

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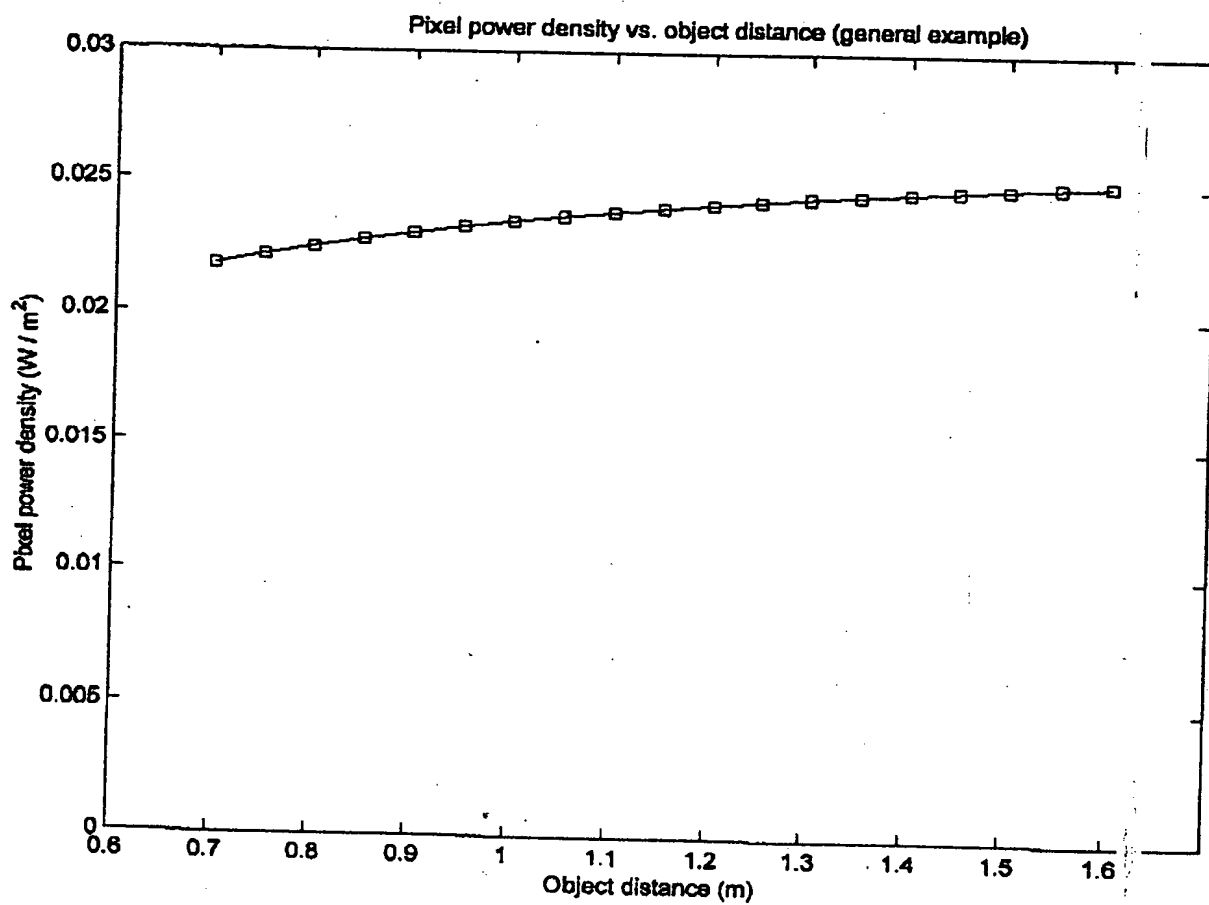


FIG-1M1

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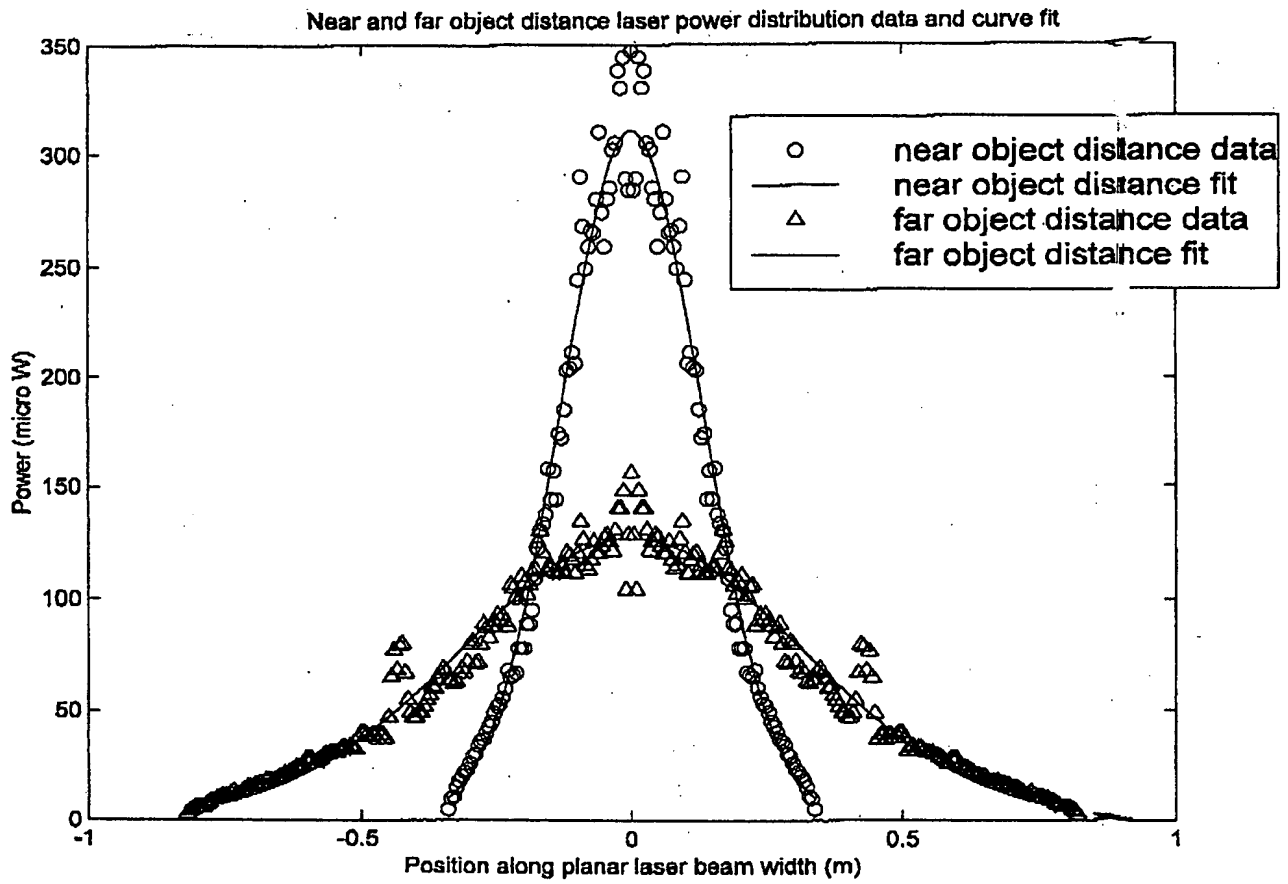


FIG. 1M2

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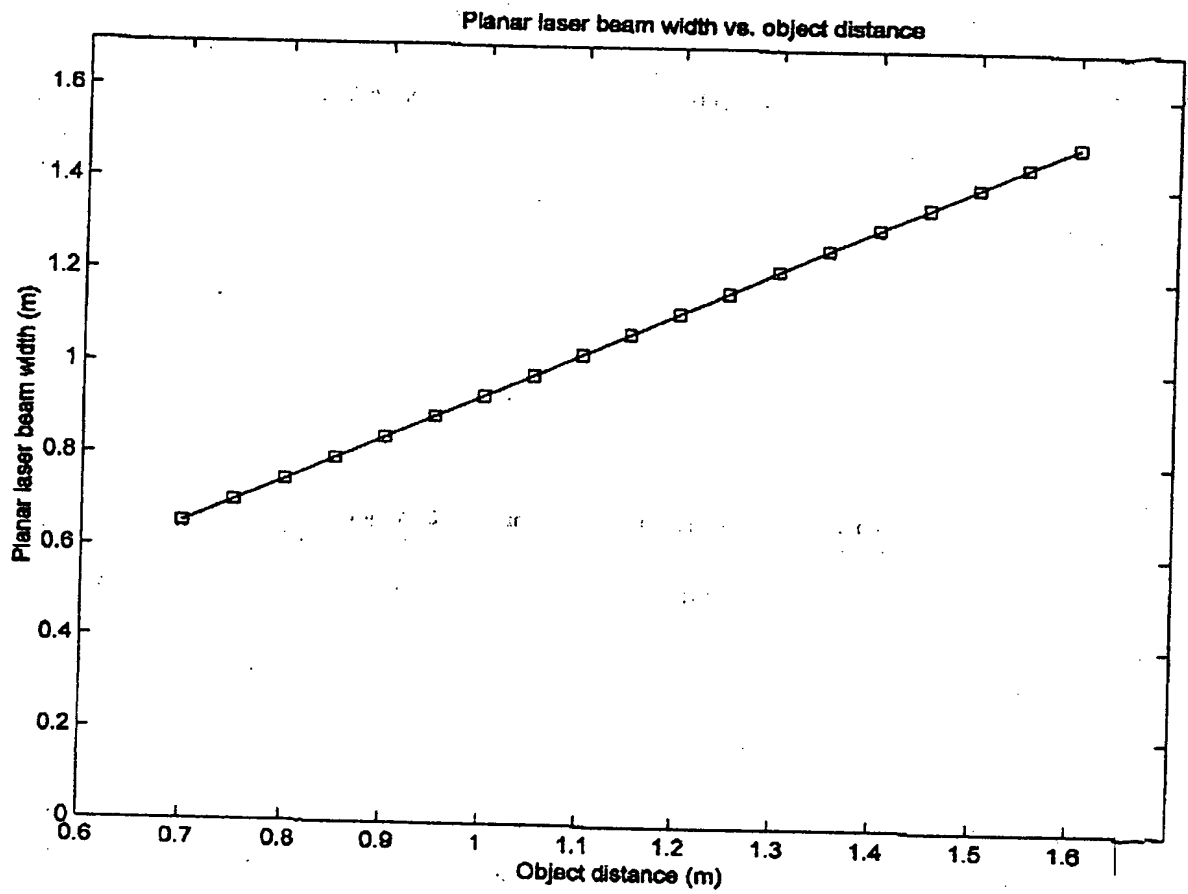


FIG. 1M3

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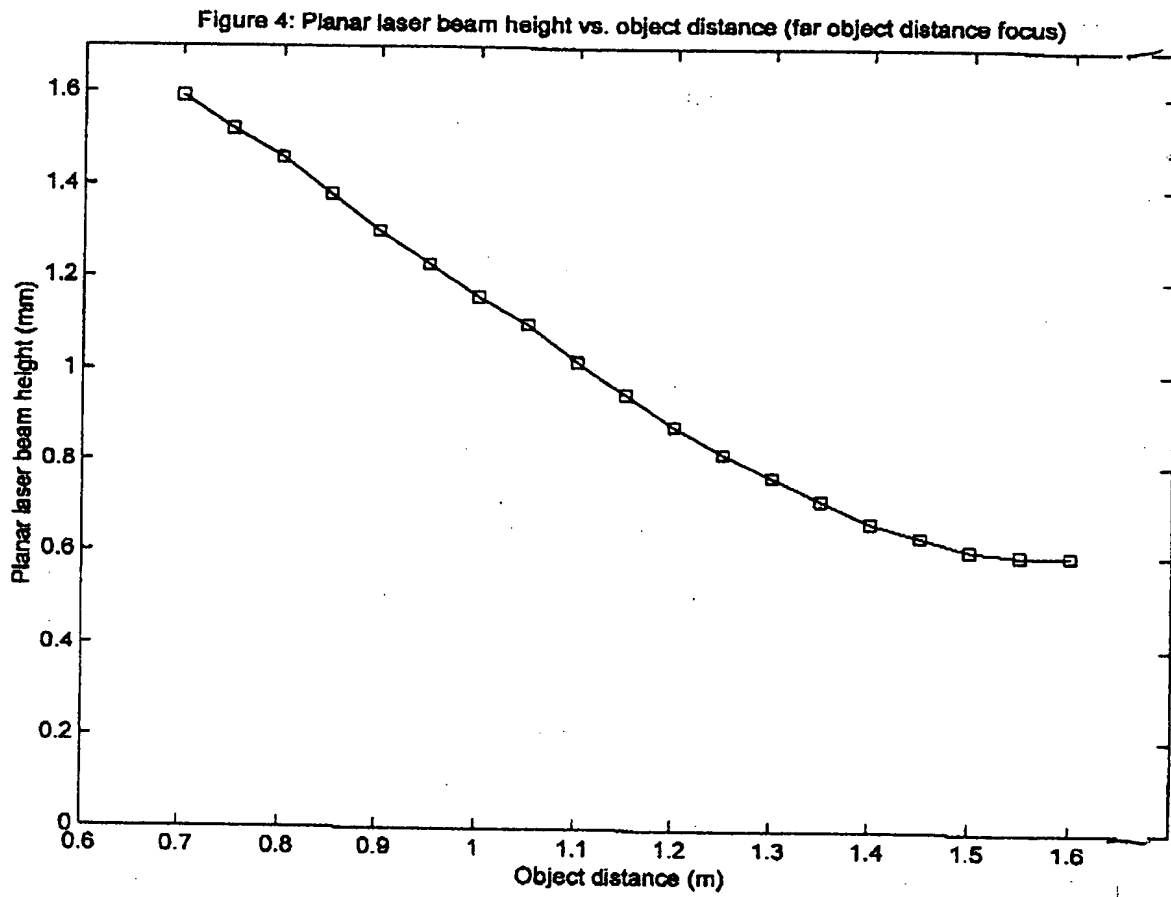


FIG 1M4



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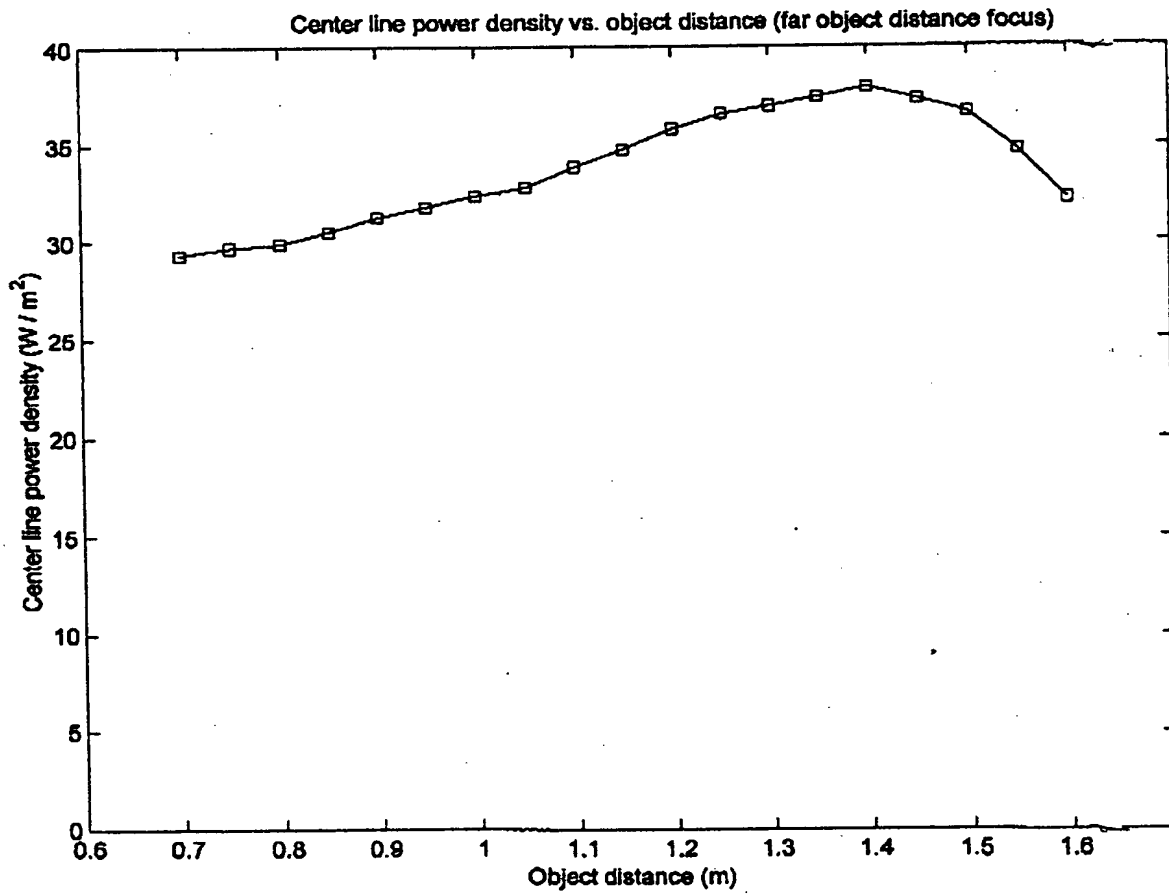


FIG. 1N

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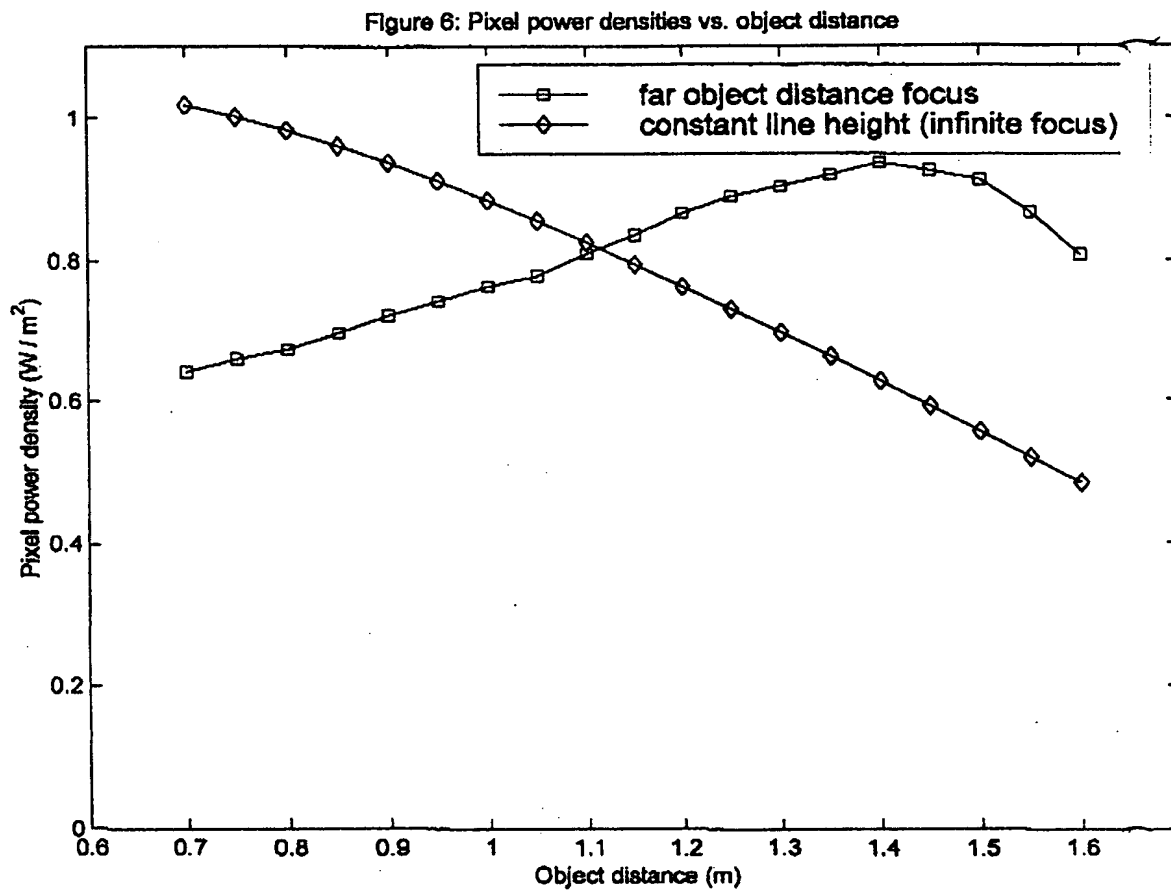


FIG. 10

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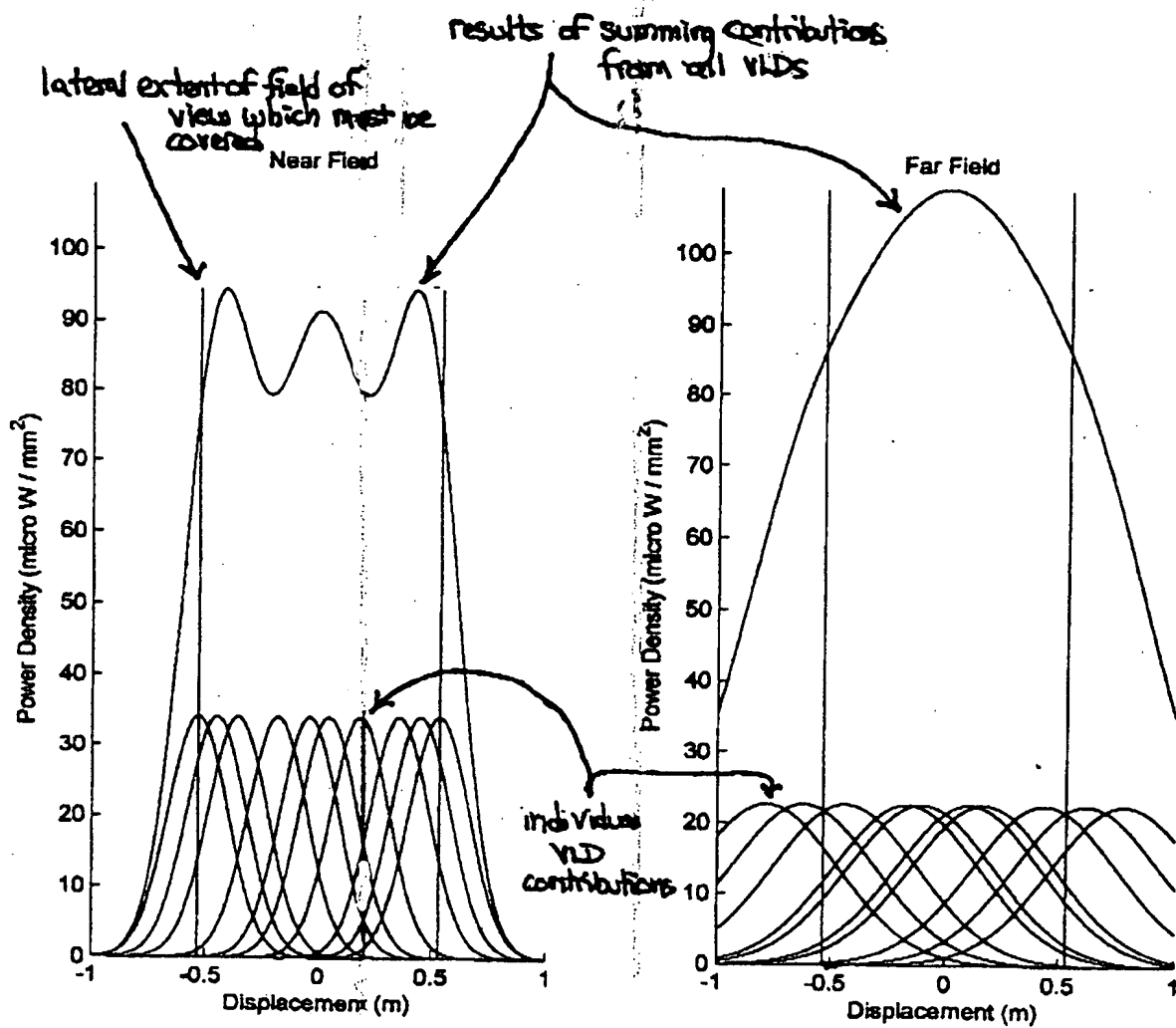


FIG. 1P1

FIG. 1P2

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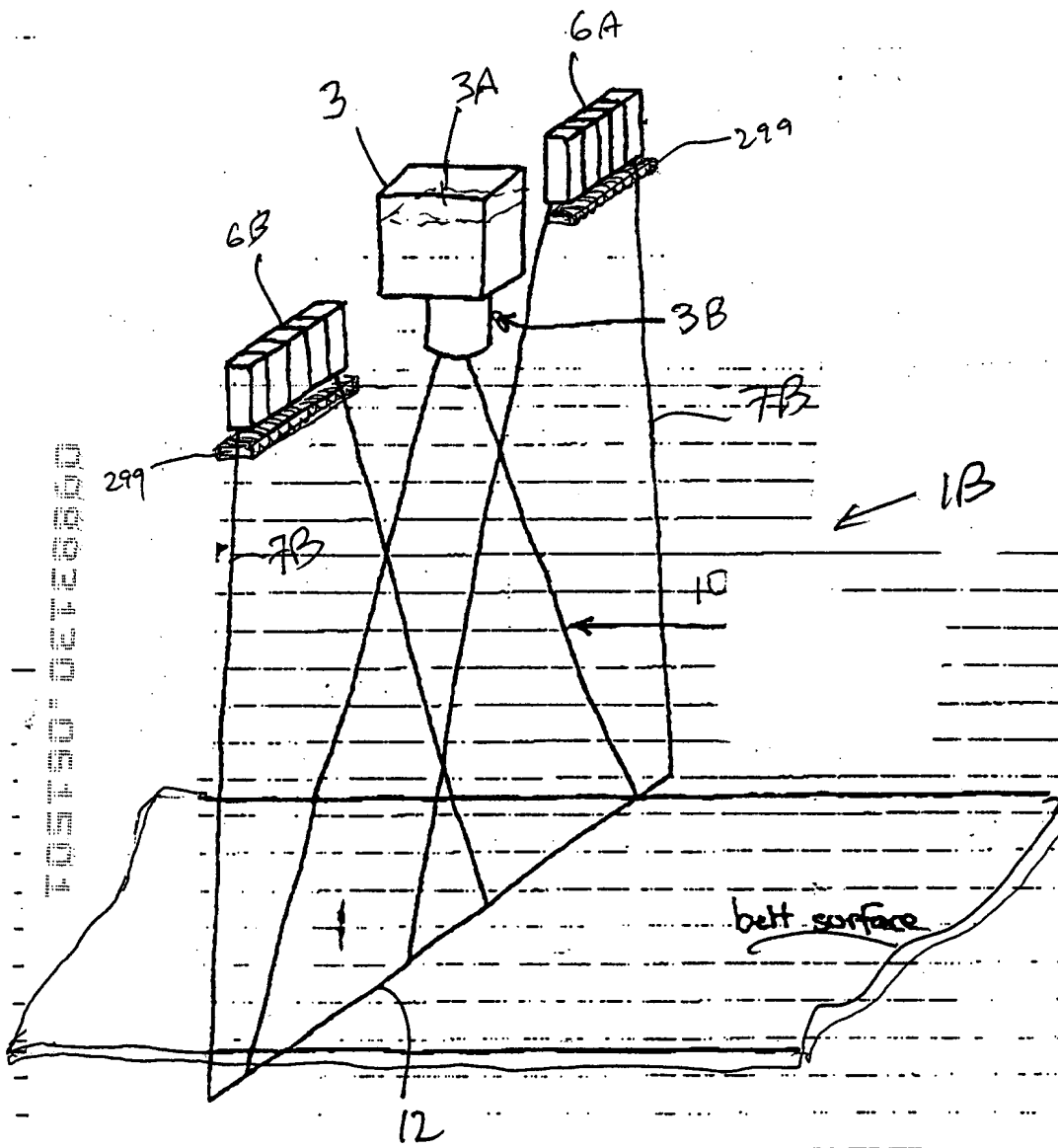


FIG. 101

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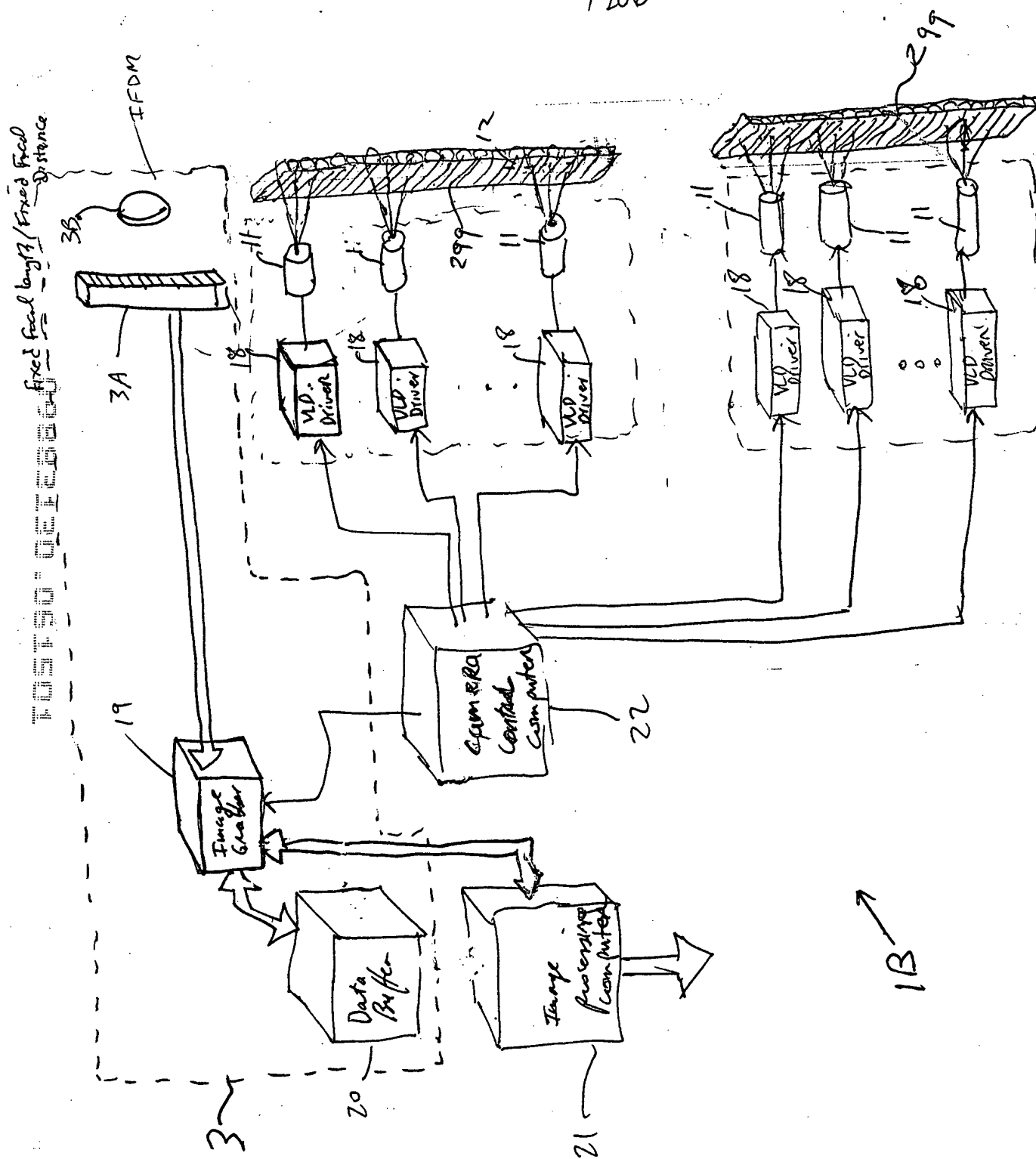
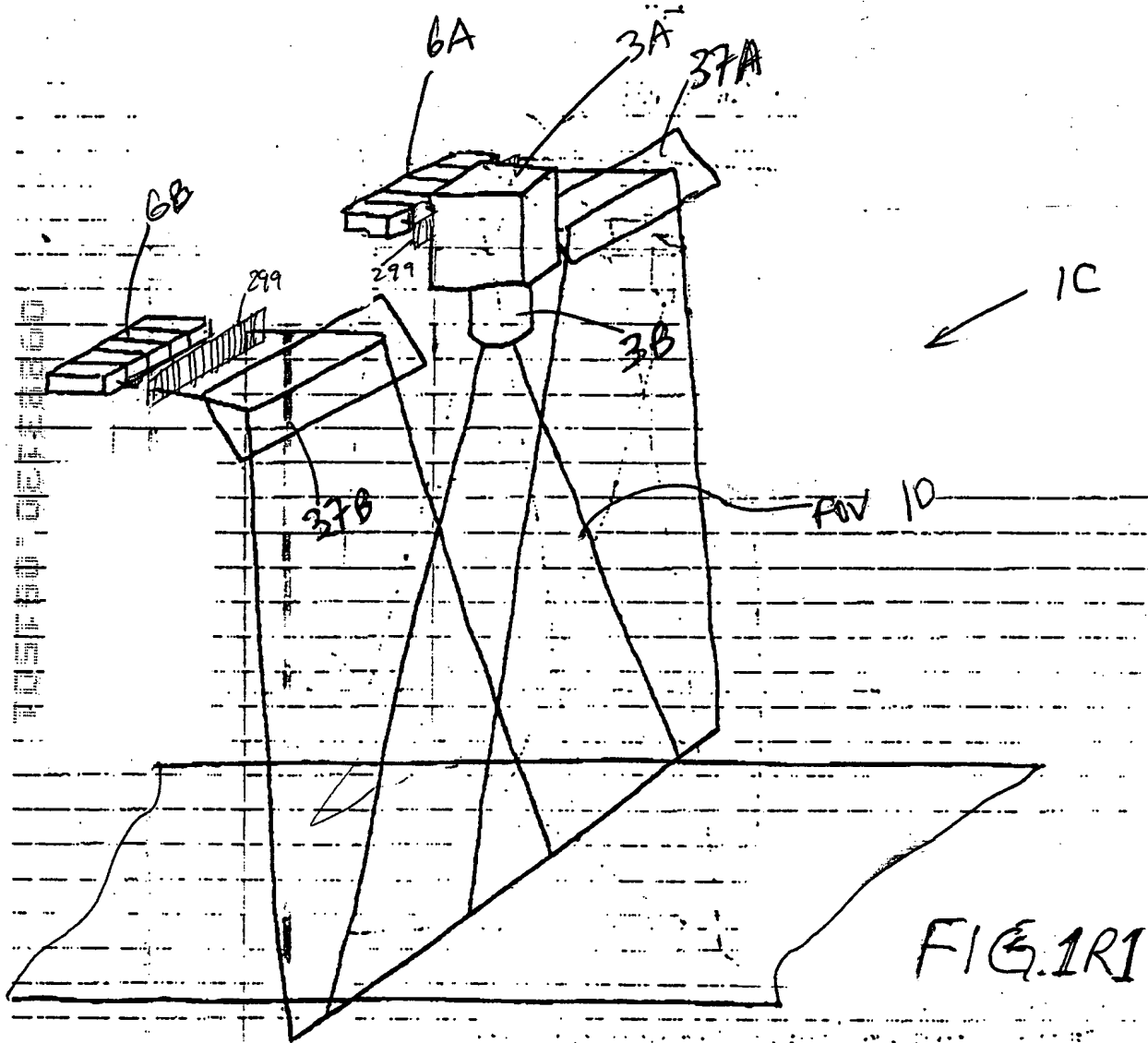
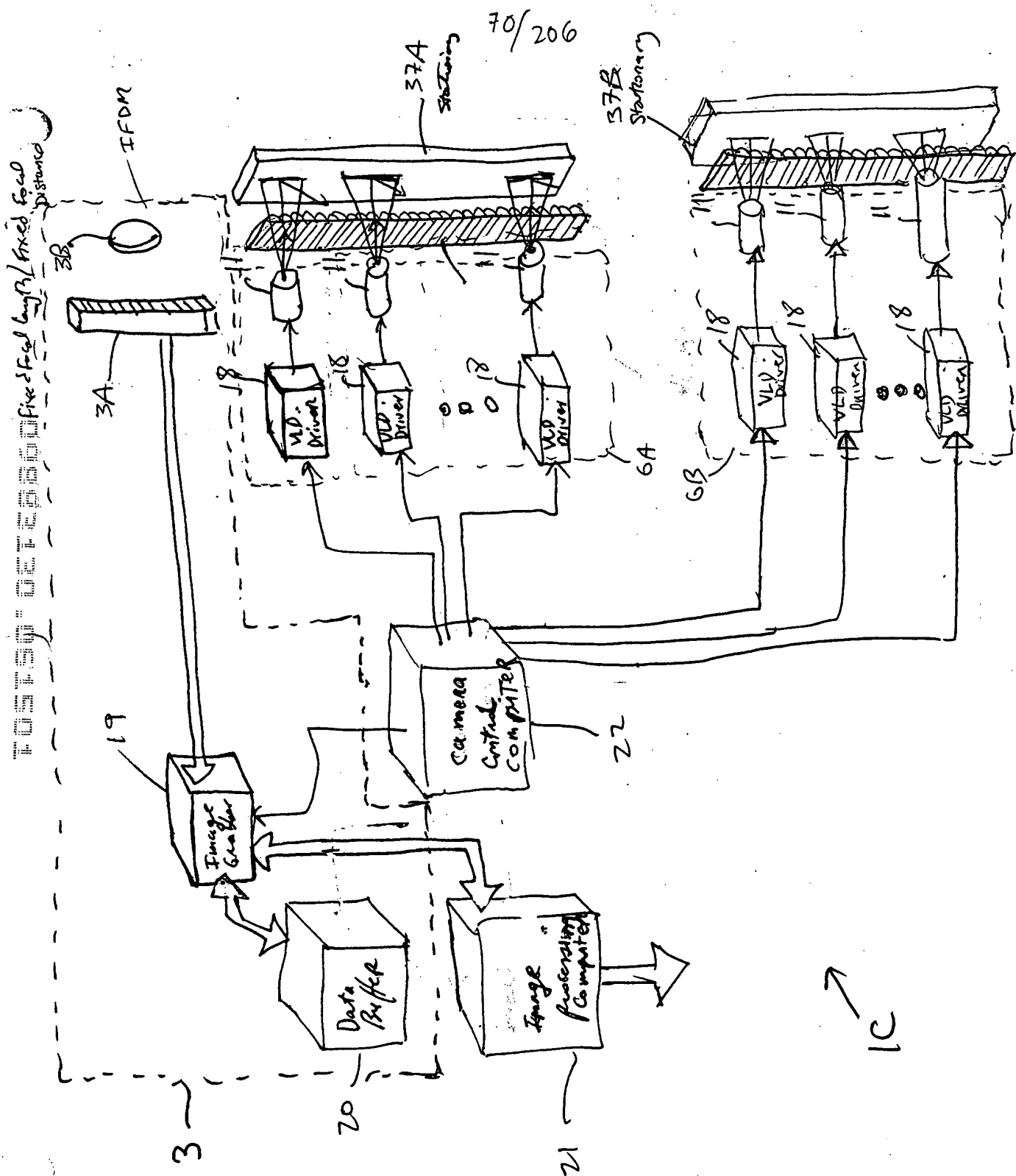


FIG. 102

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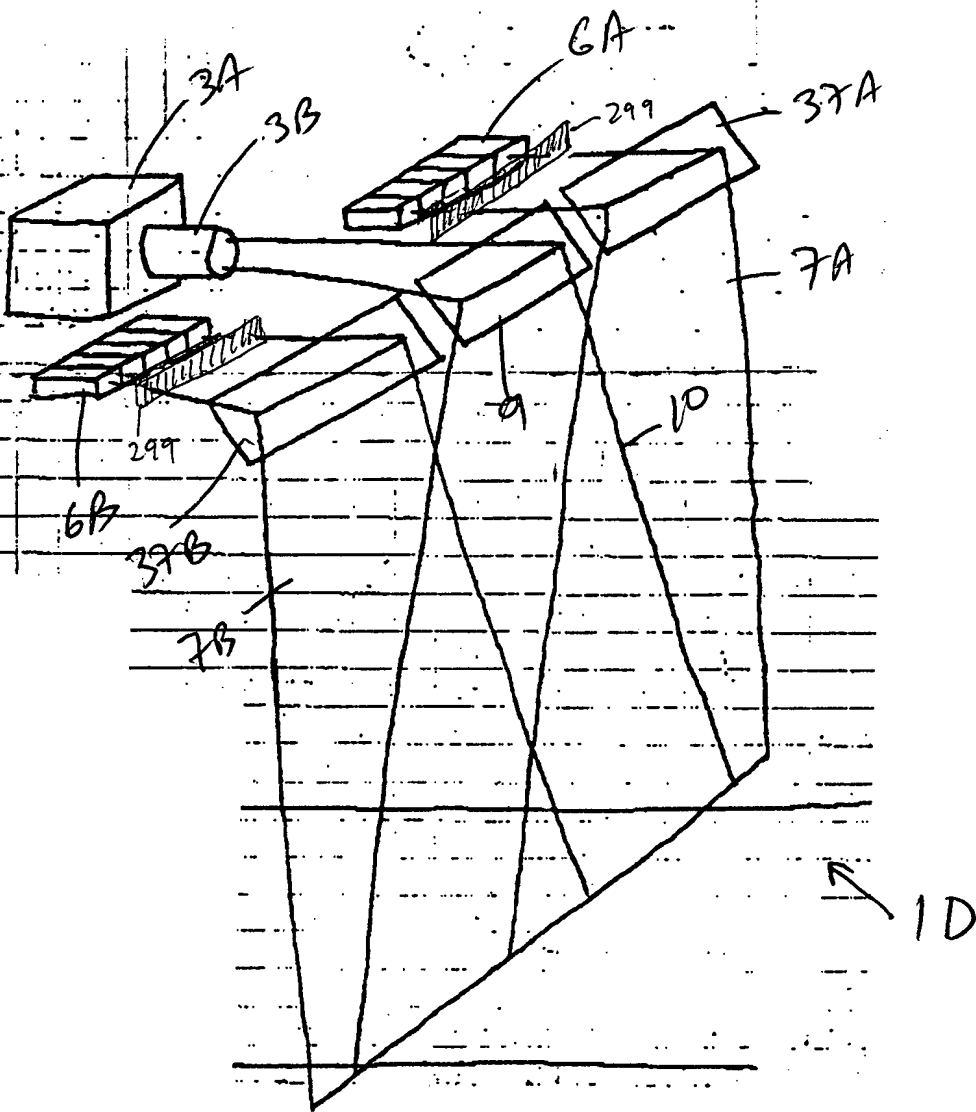


FIG. 1S1



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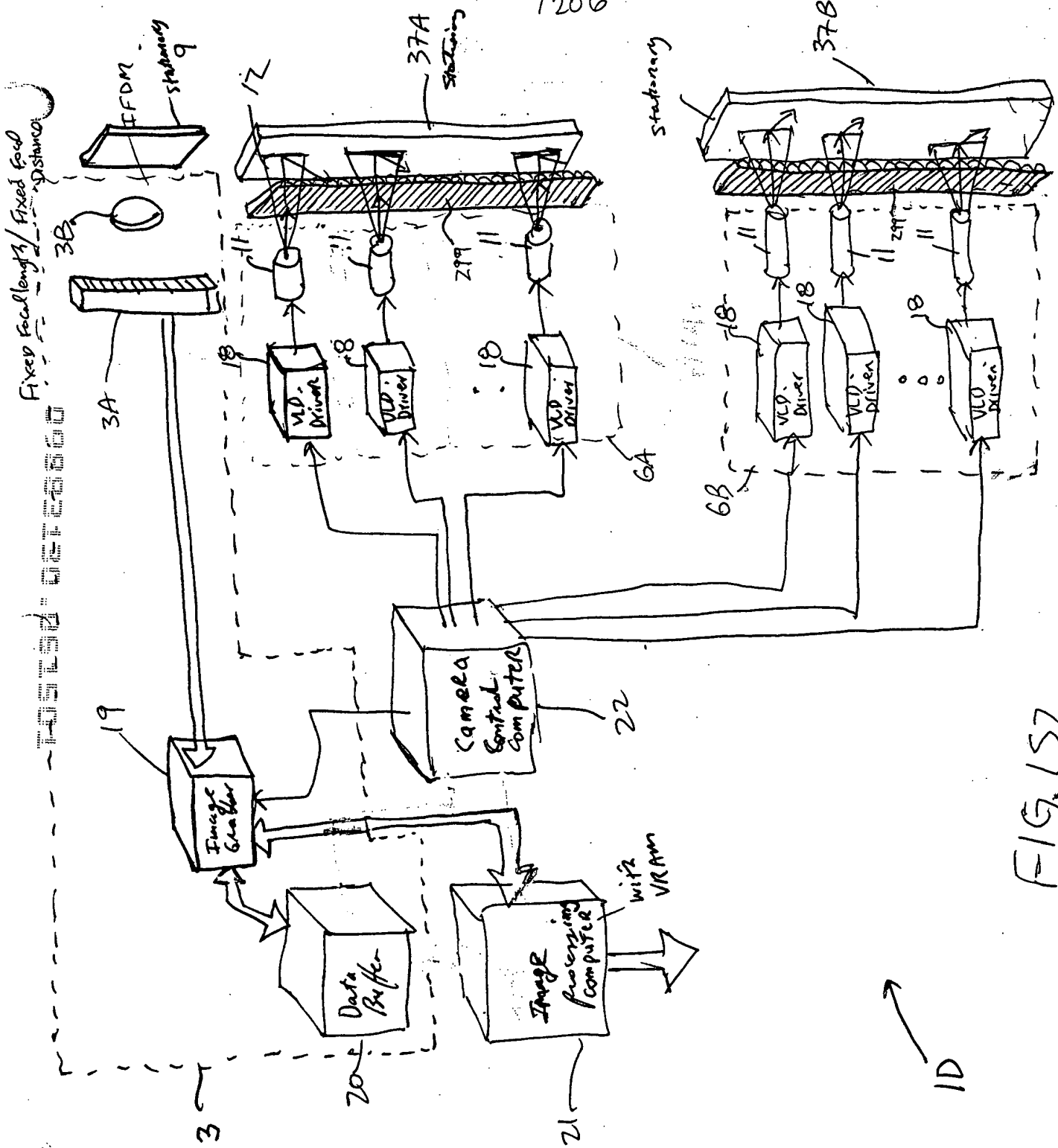
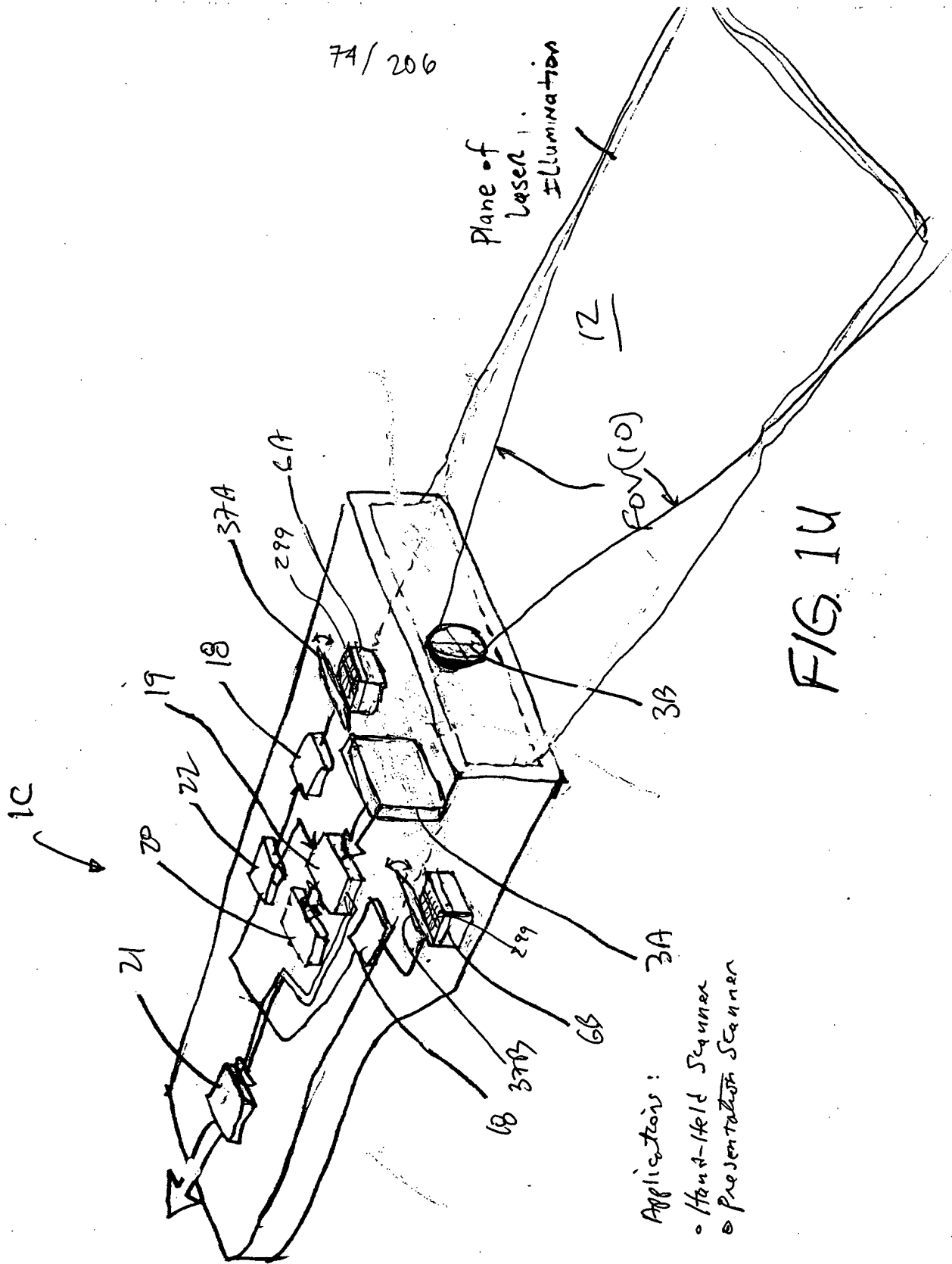


FIG. 1S2

1D



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Applications:

- Hand-Held Scanner
- Presentation Scanner

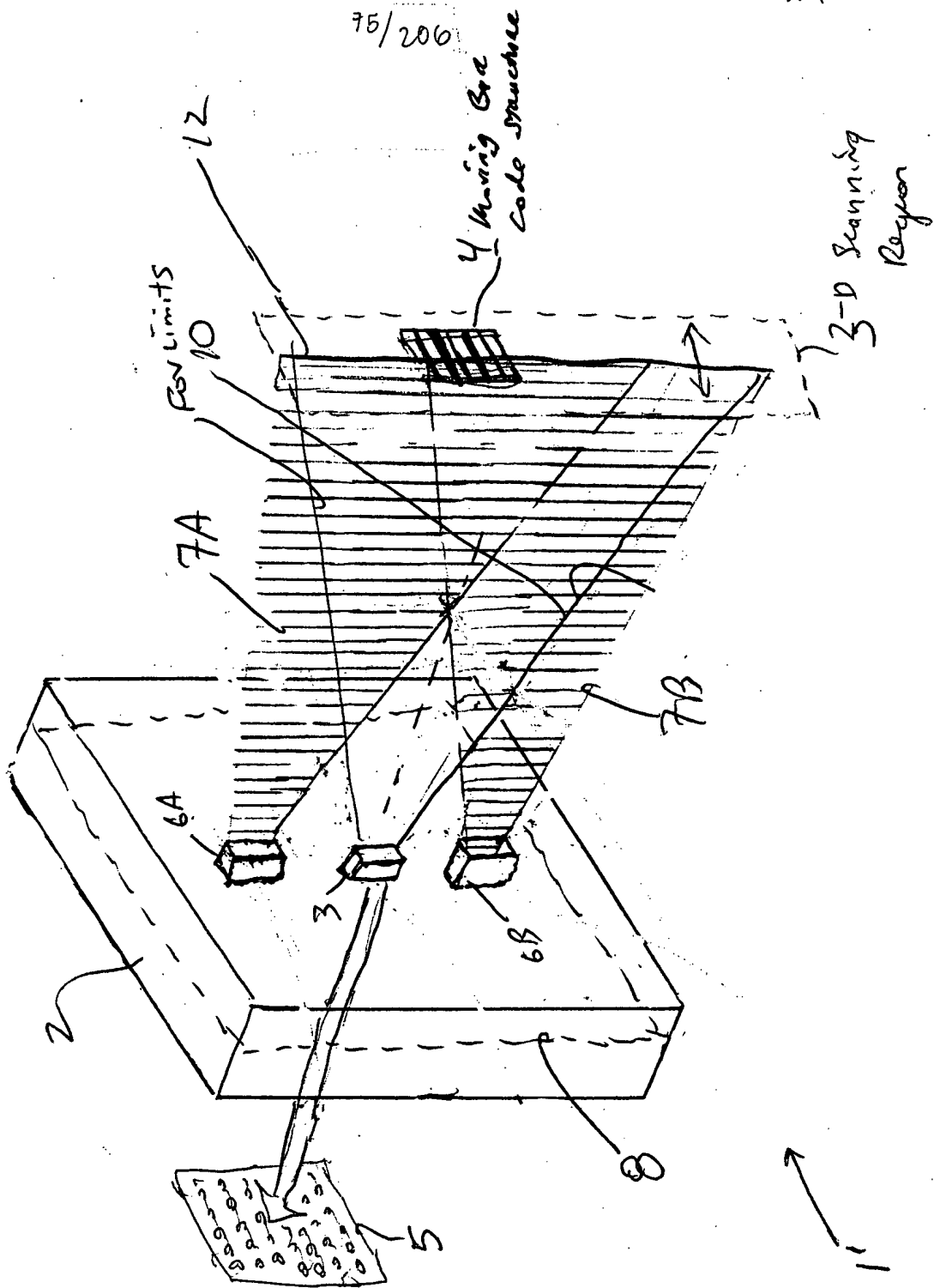


FIG. 1VI

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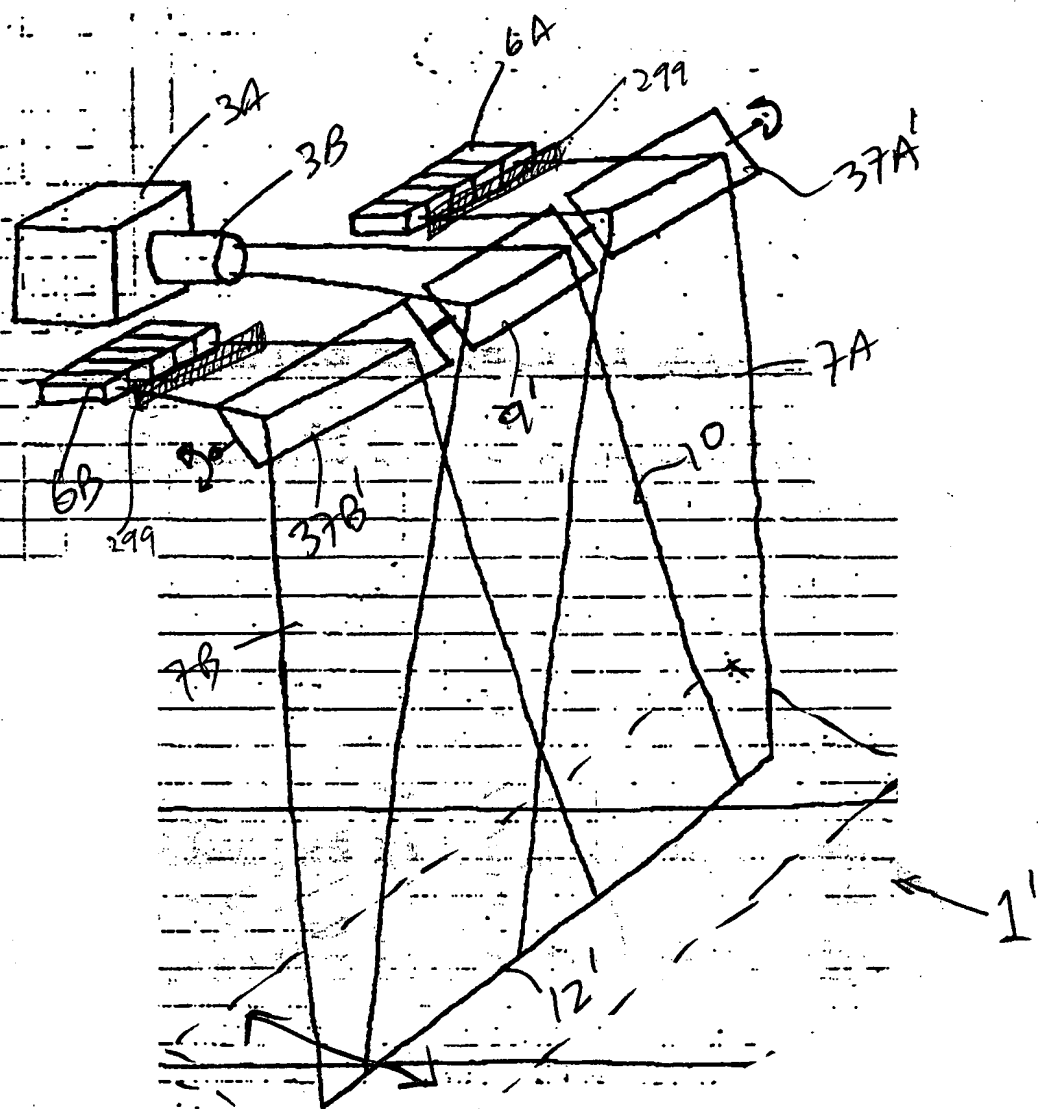
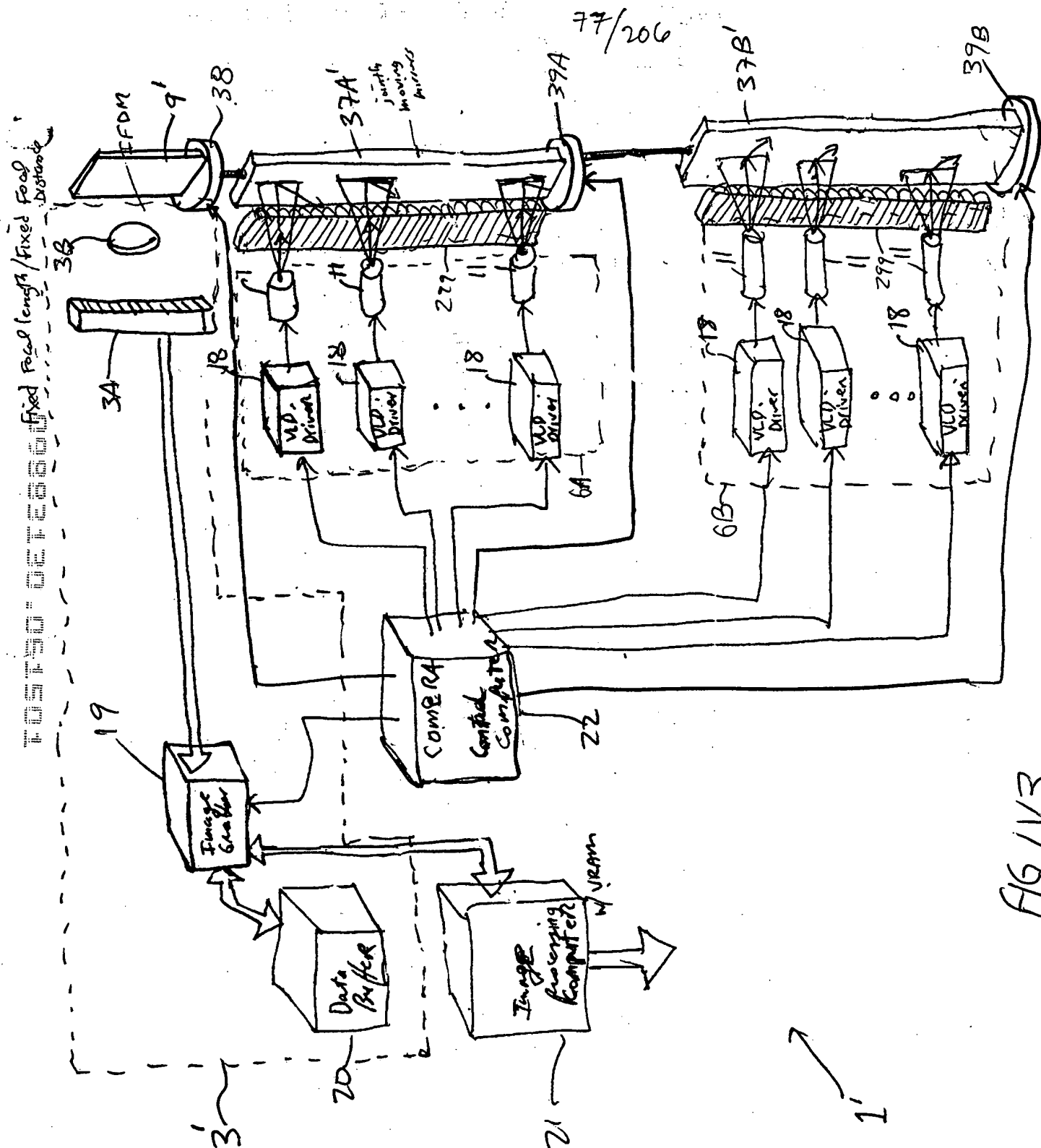
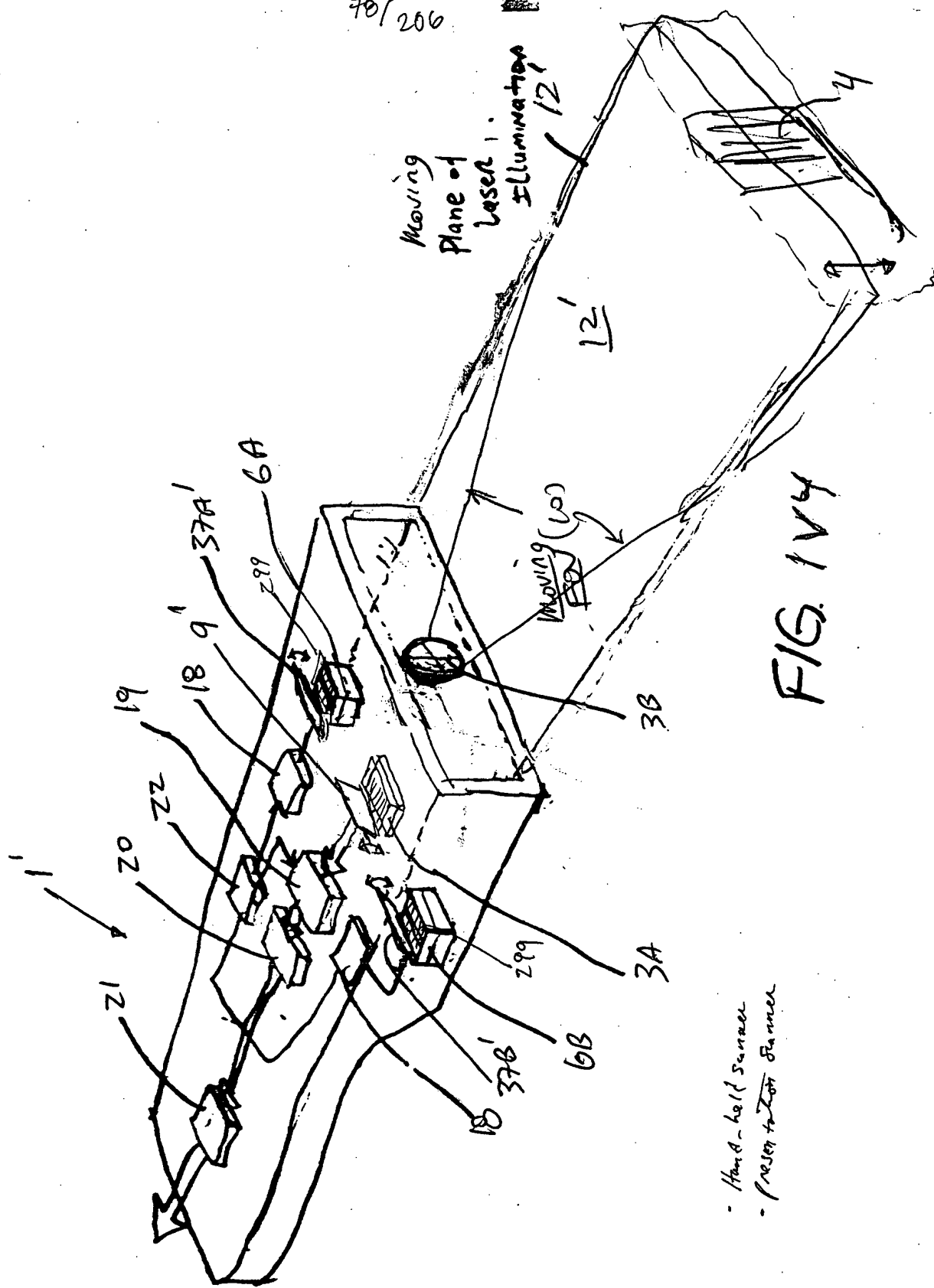


FIG. IV2



AG.1V3

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Moving  
Plane of  
Laser  
Illumination

FIG. 1V4

- Hand-held scanner
- Projector to ~~Left~~ Scanner

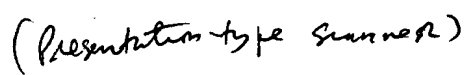
[illegible]

FIG. 1 V5



FOSTER OCT 20 1960

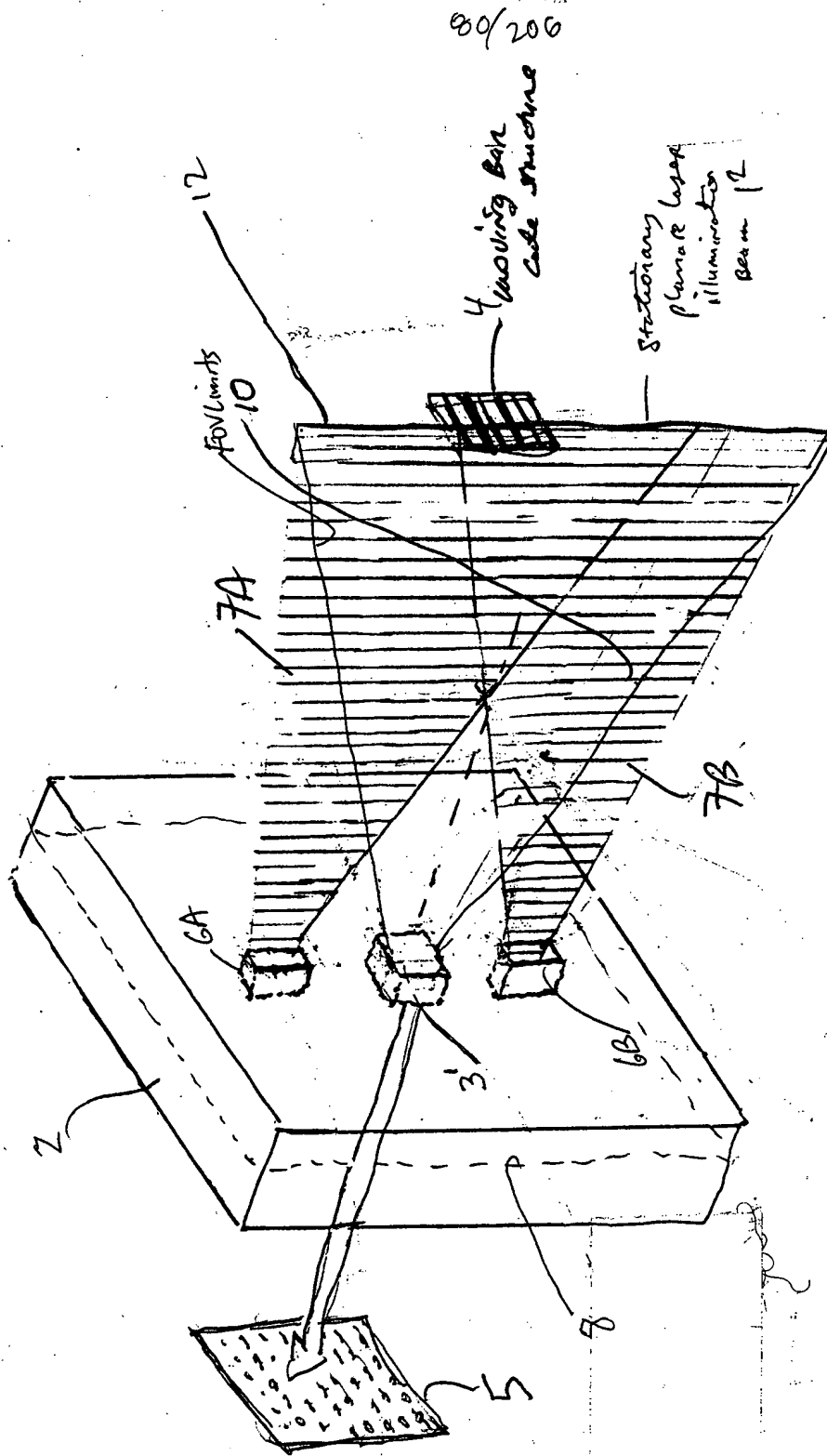


FIG. 2A

40

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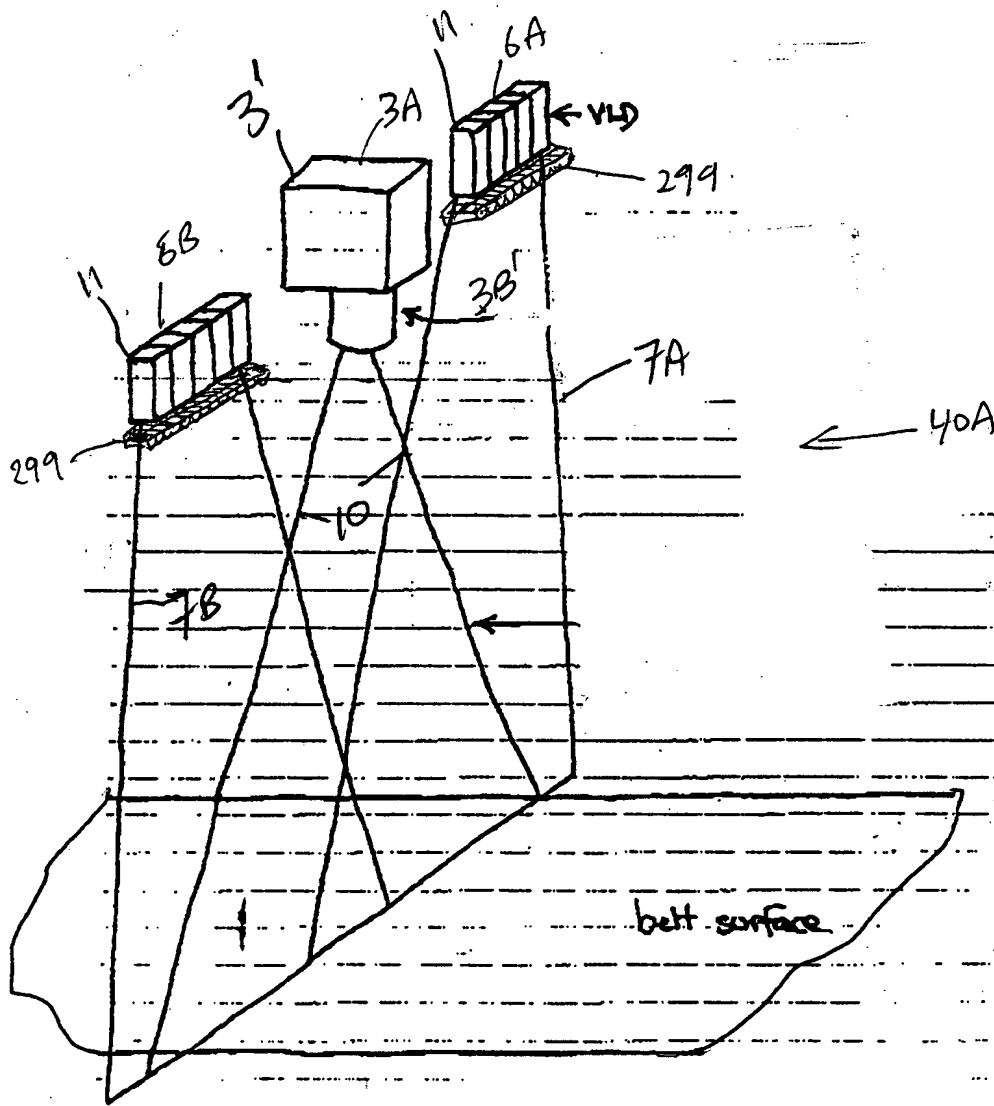


FIG. 2 B1

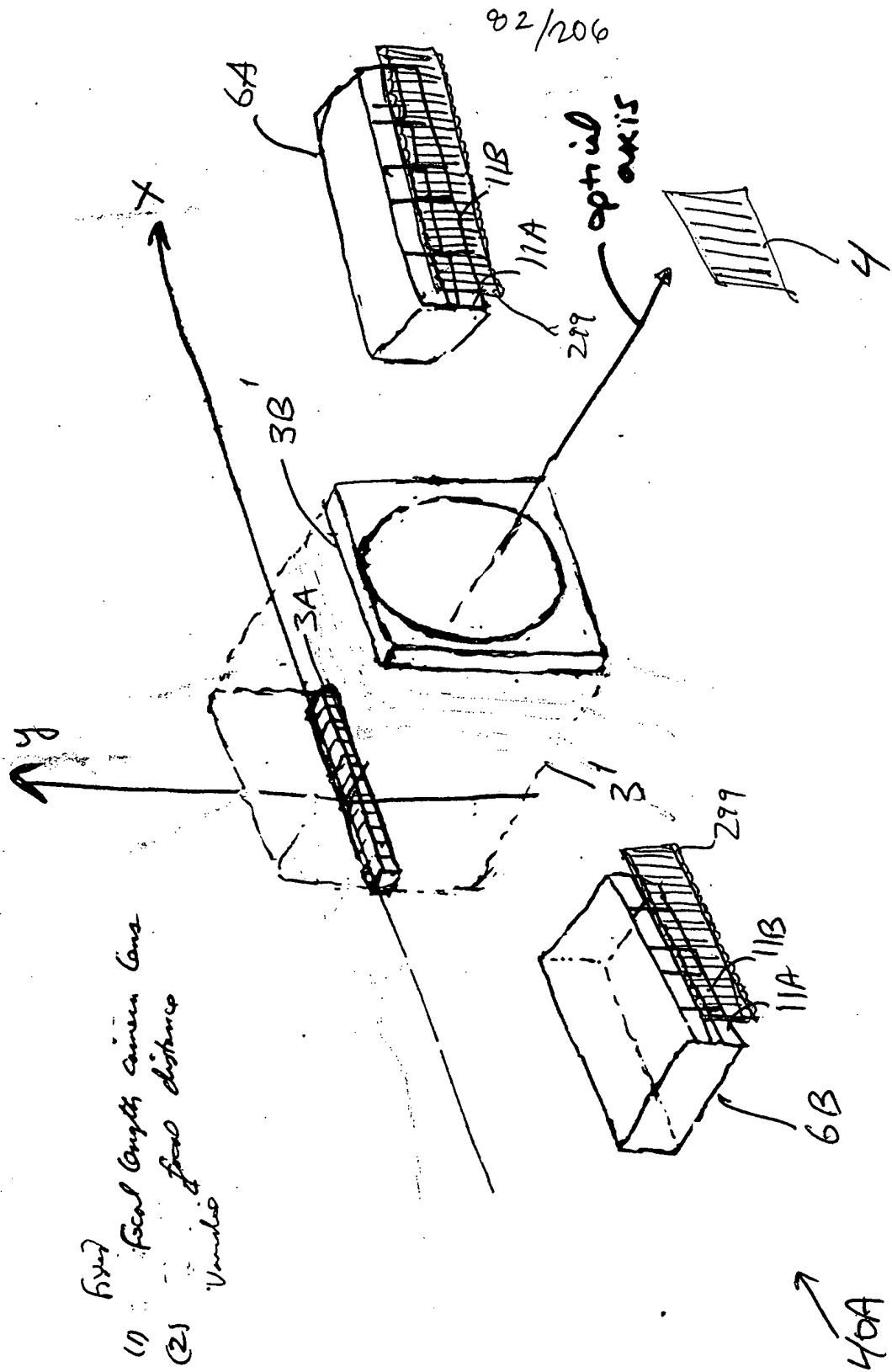


FIG. 2B2

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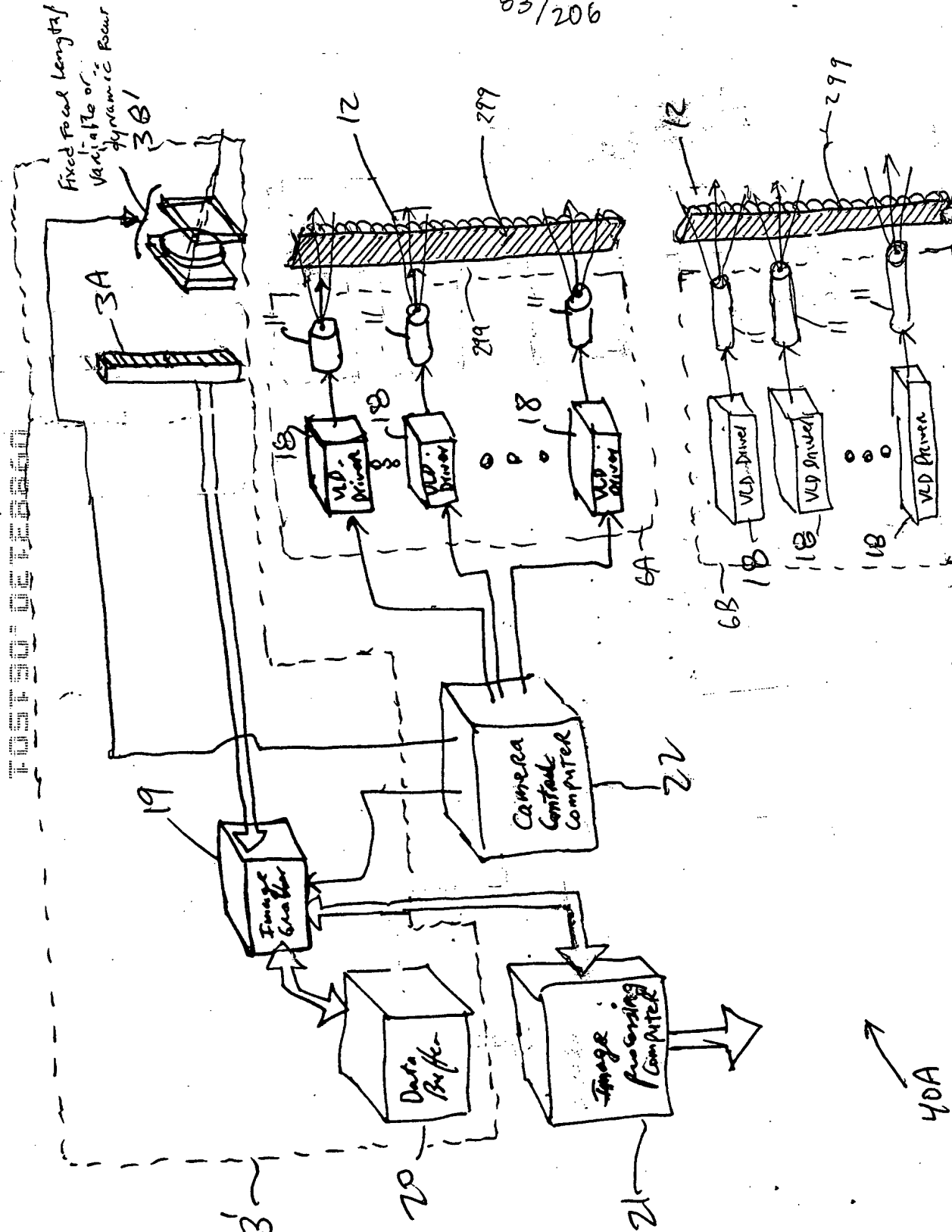


FIG. 2C1

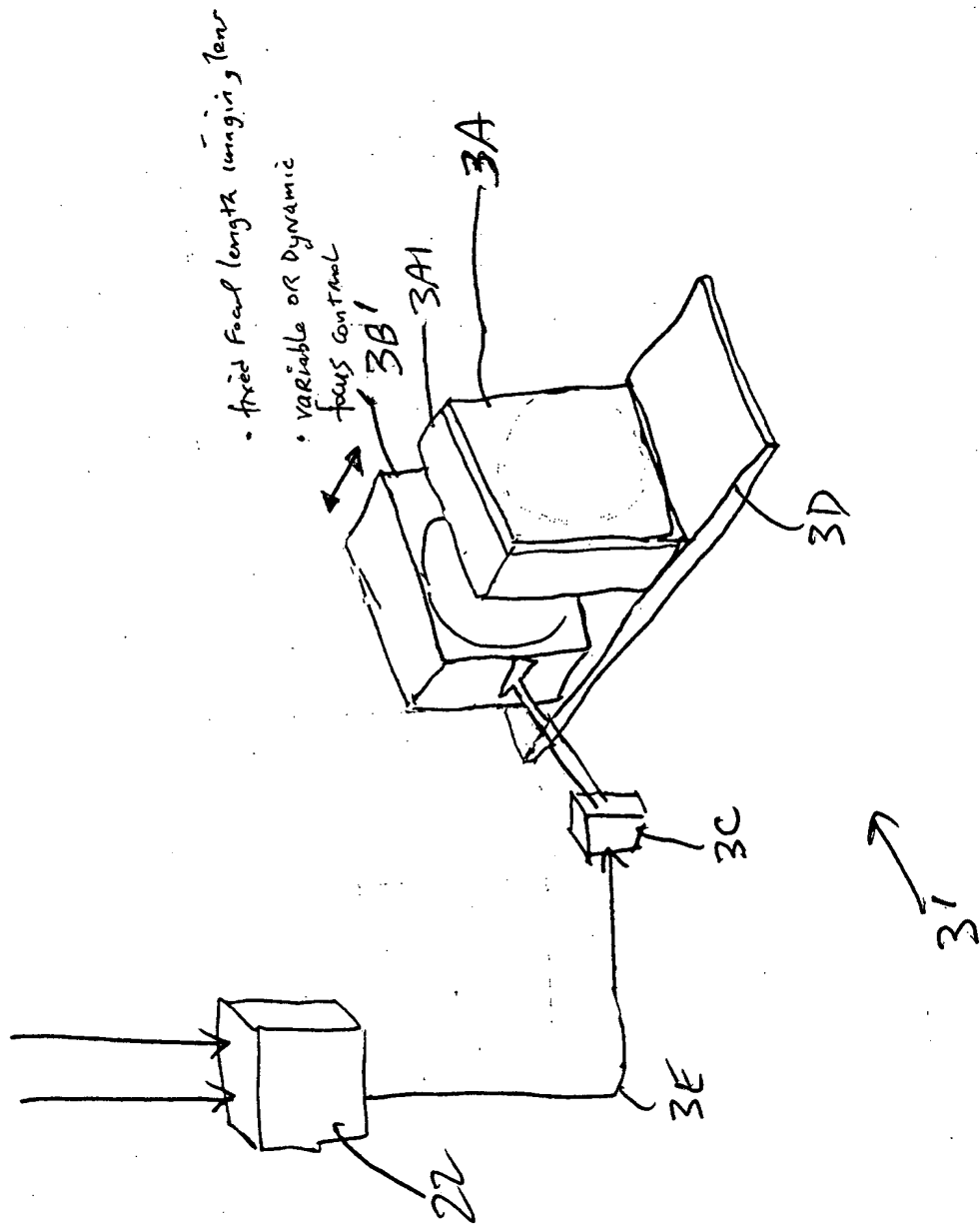


FIG. 2C2

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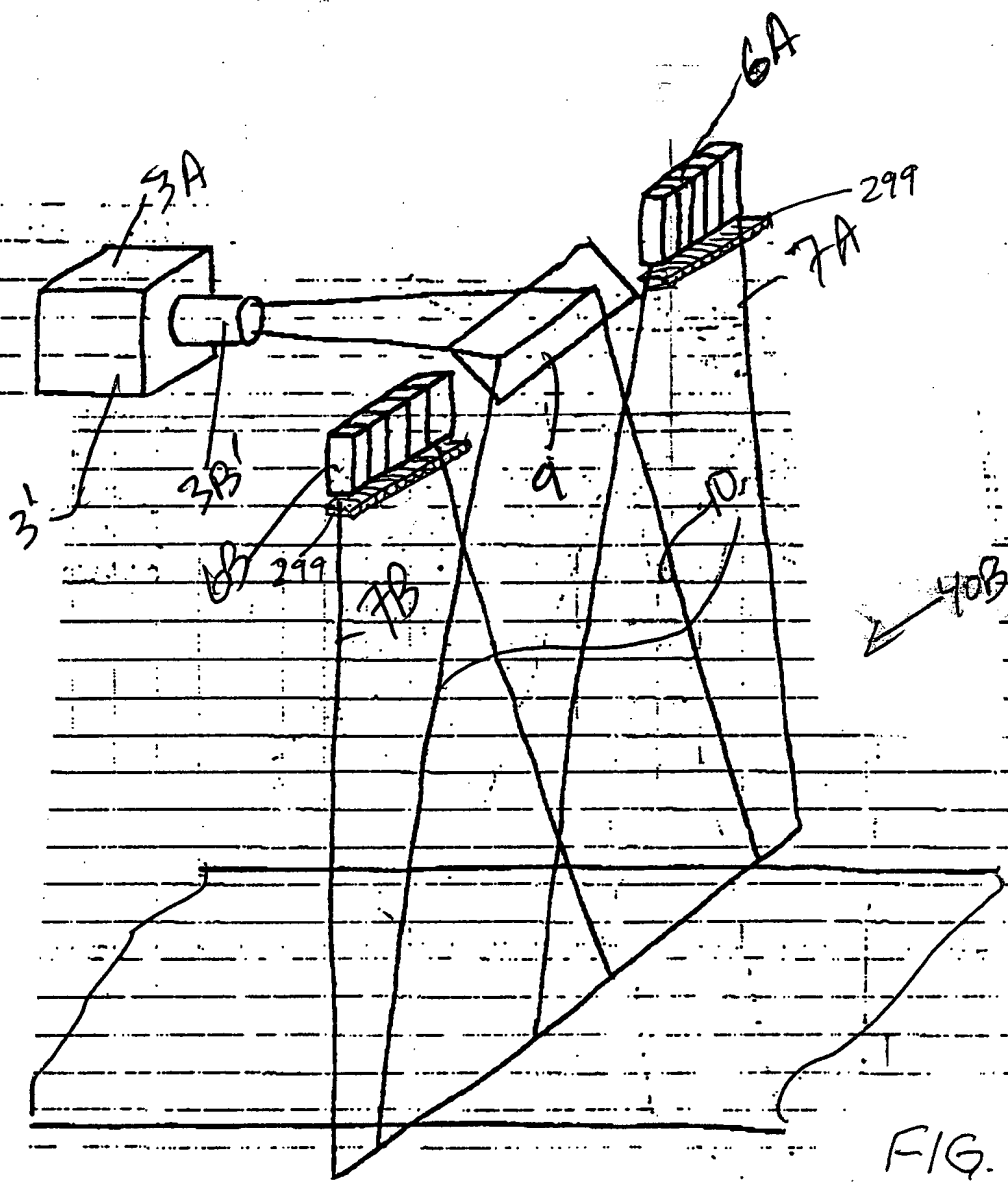


FIG. 2D1

TOP SECRET

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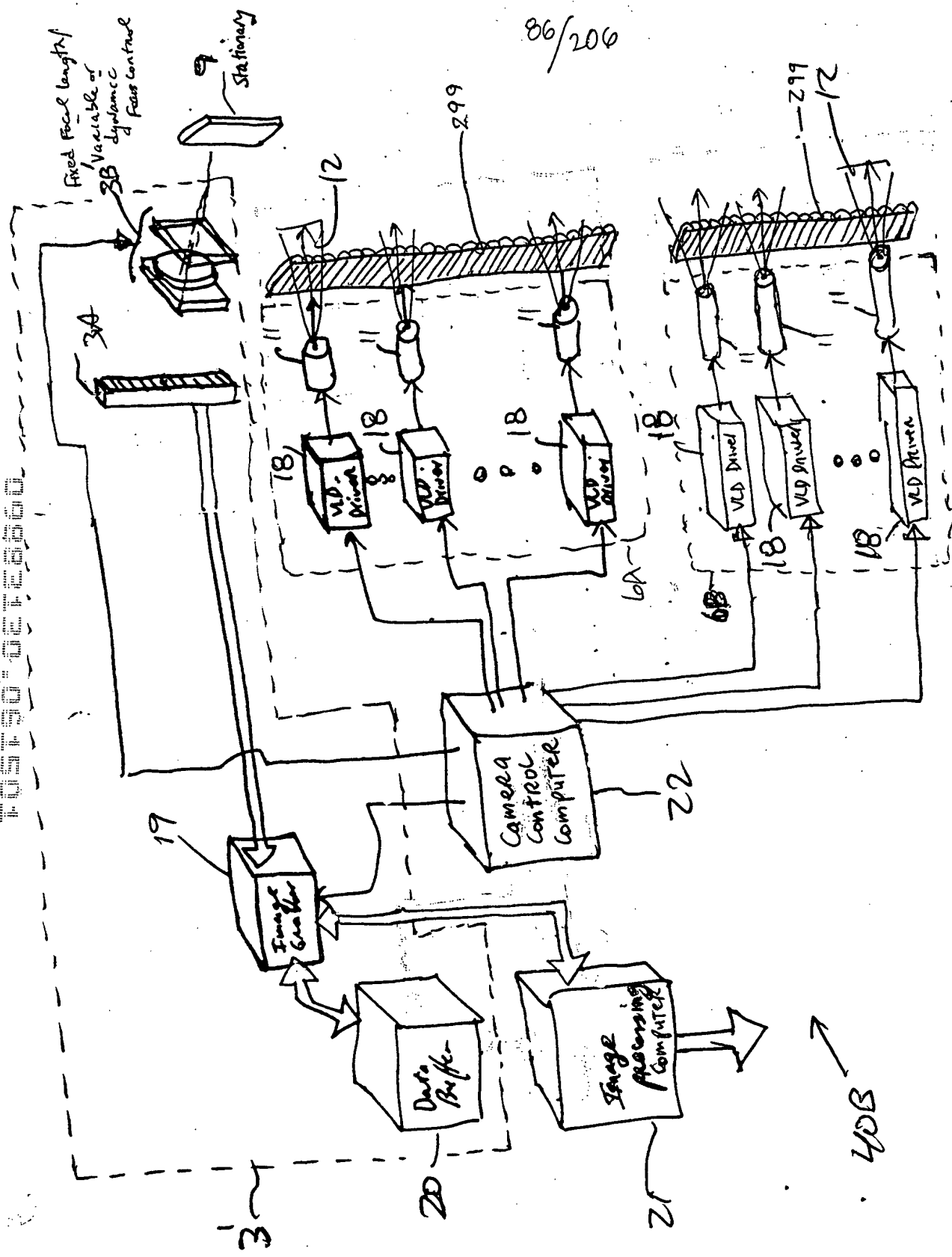


FIG. 2D2

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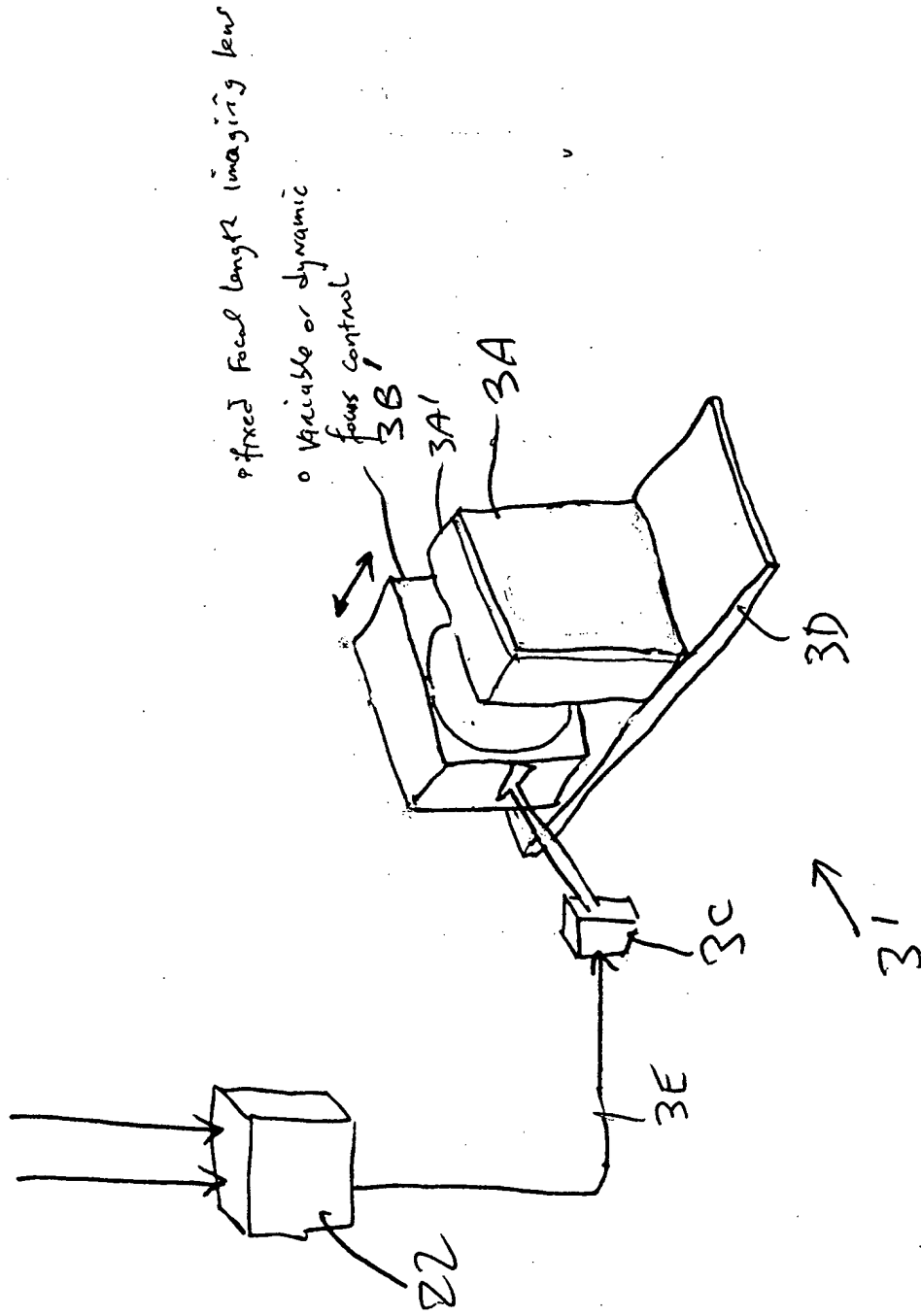


FIG. 2D3



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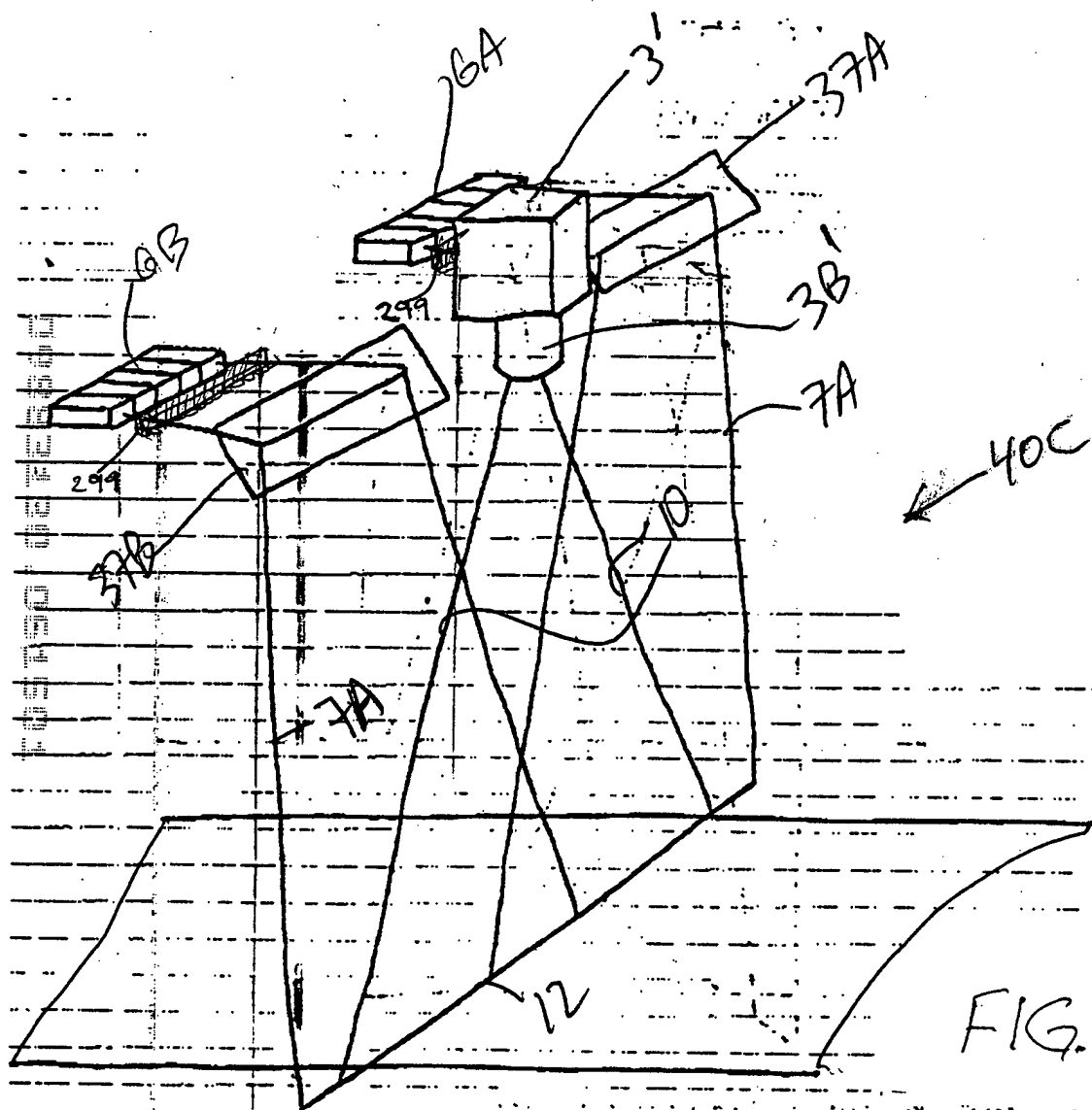


FIG. 2E1

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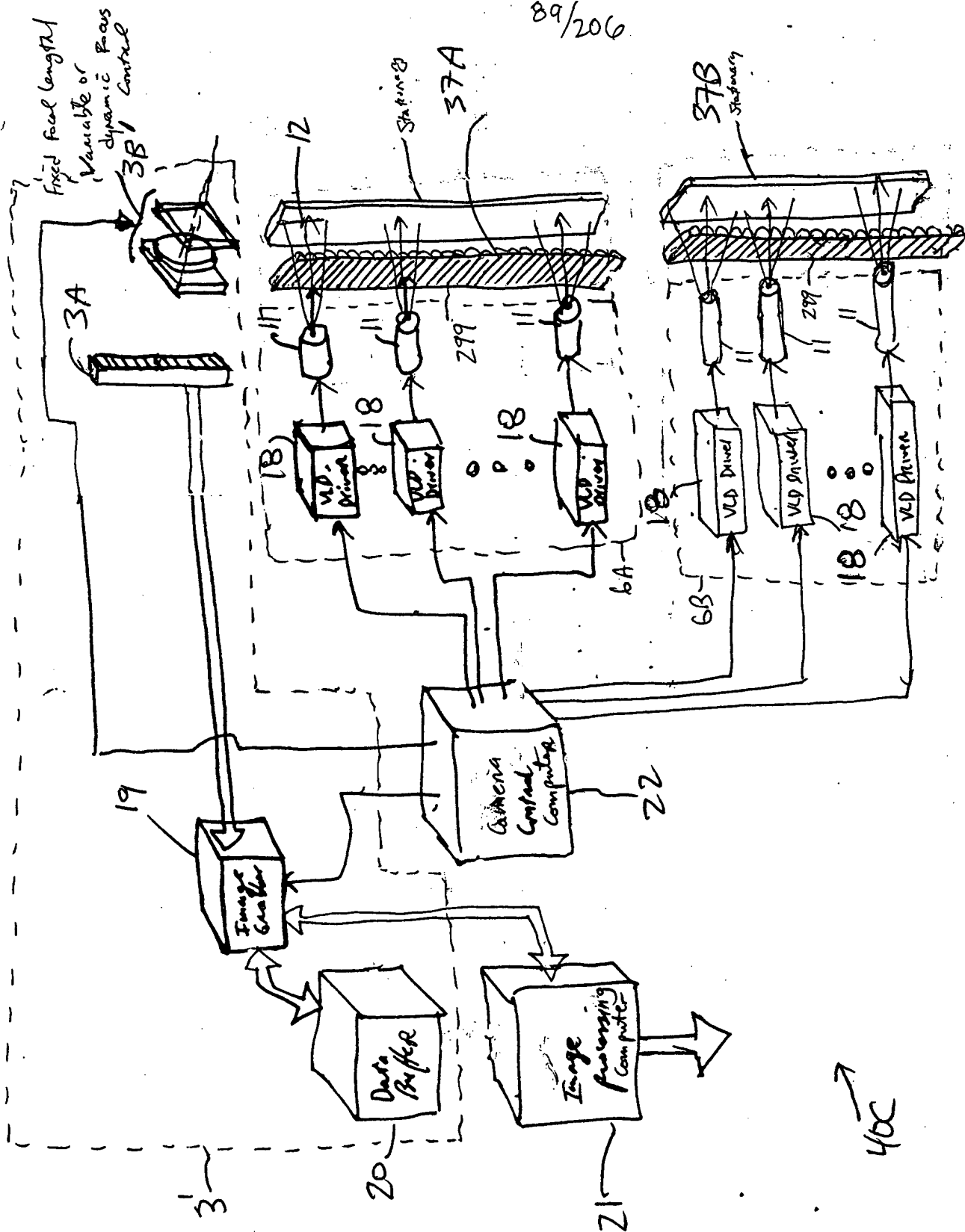
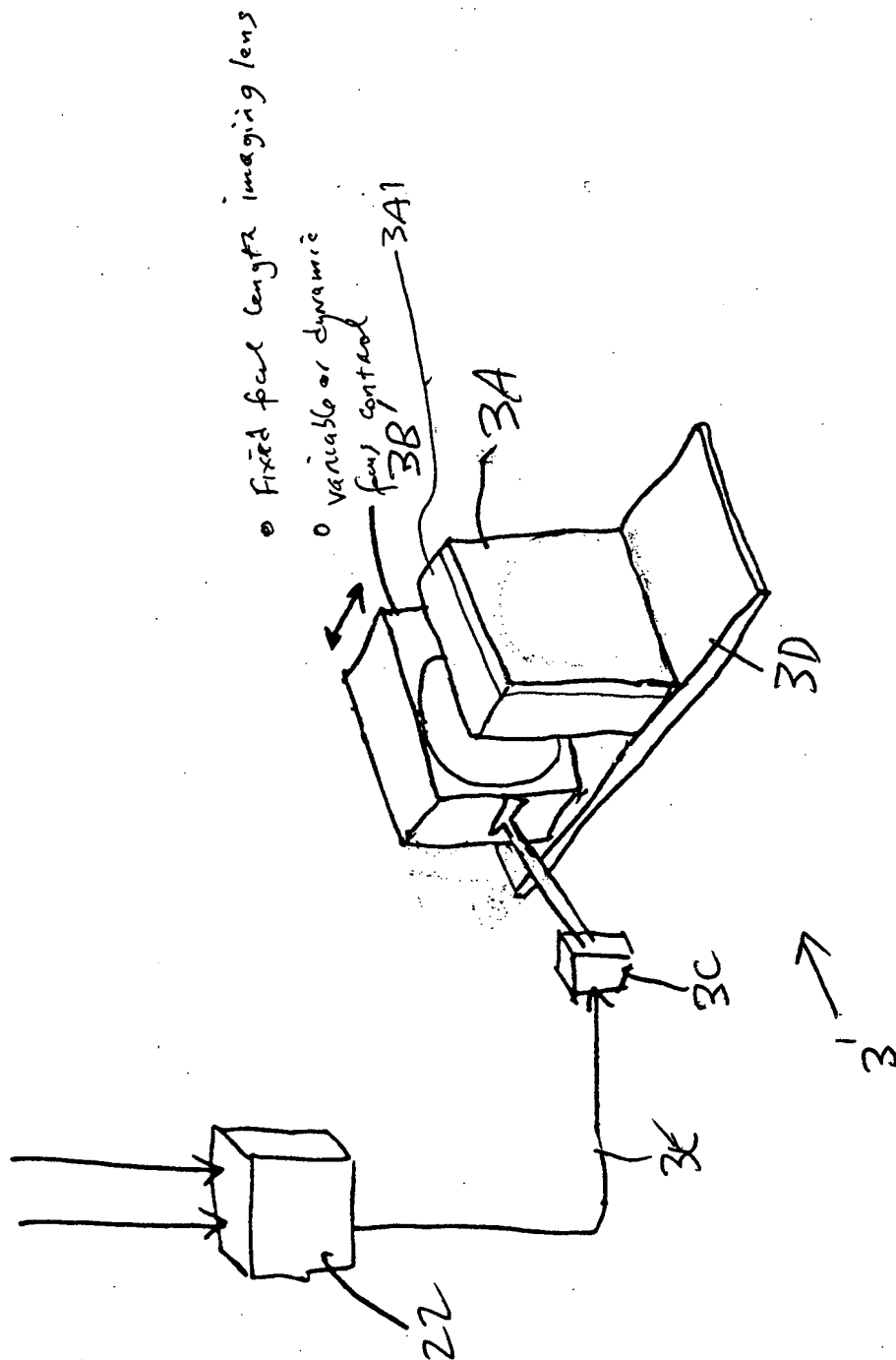


FIG. 2E2



• Fixed focal length imaging lens  
 • variable or dynamic  
 focal control

FIG. 2E3

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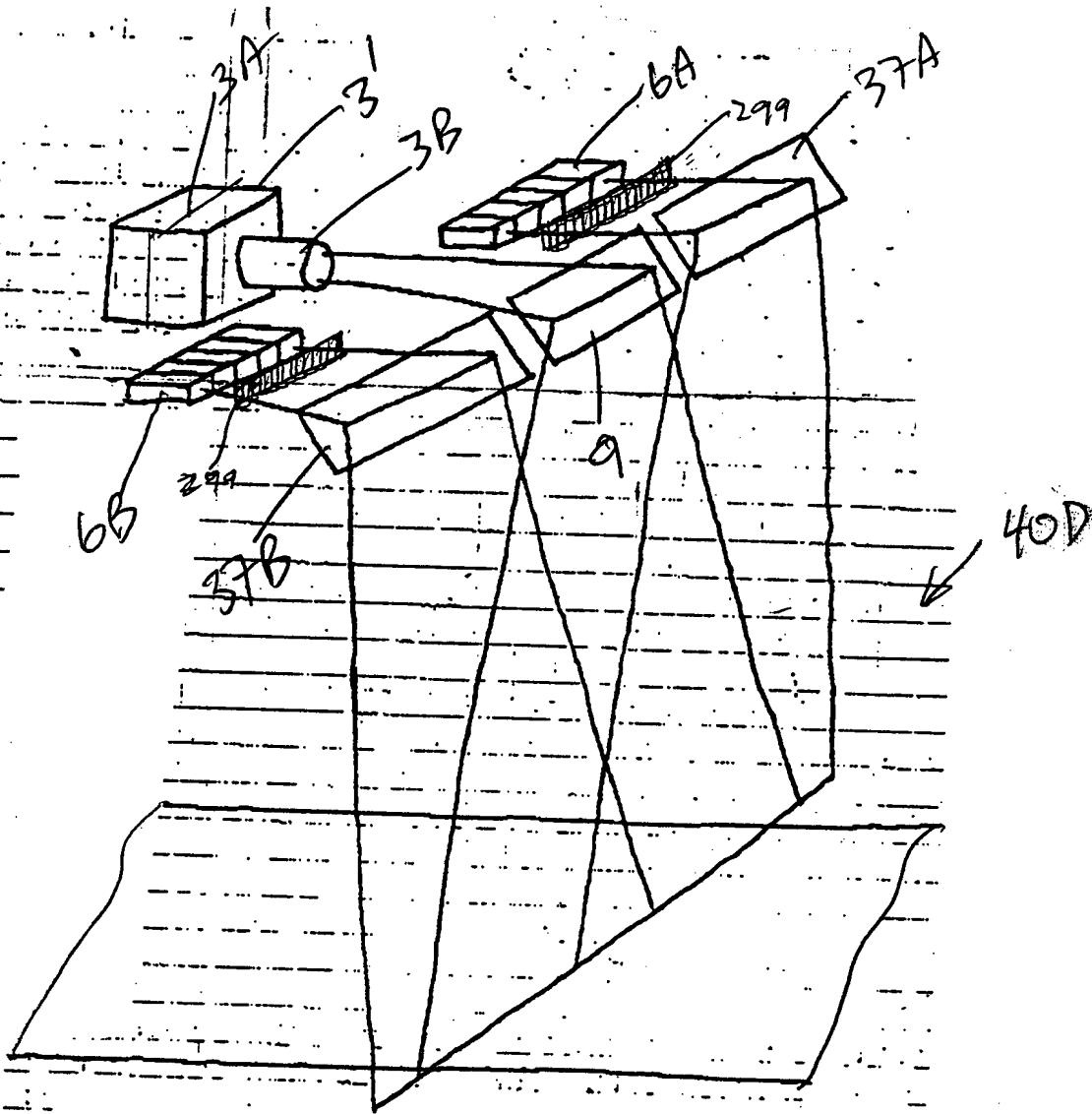


FIG. 2F1

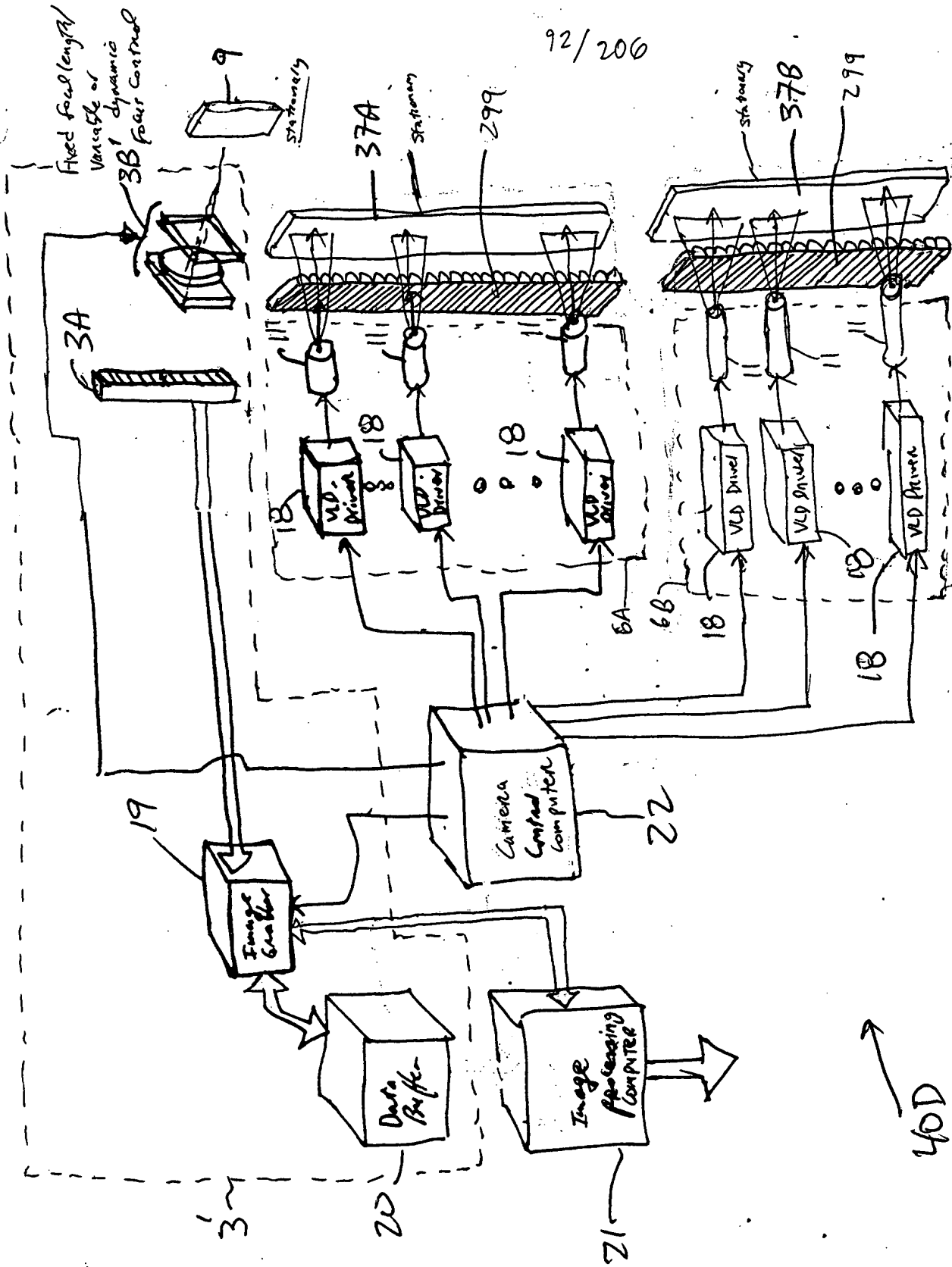


FIG. 2FZ

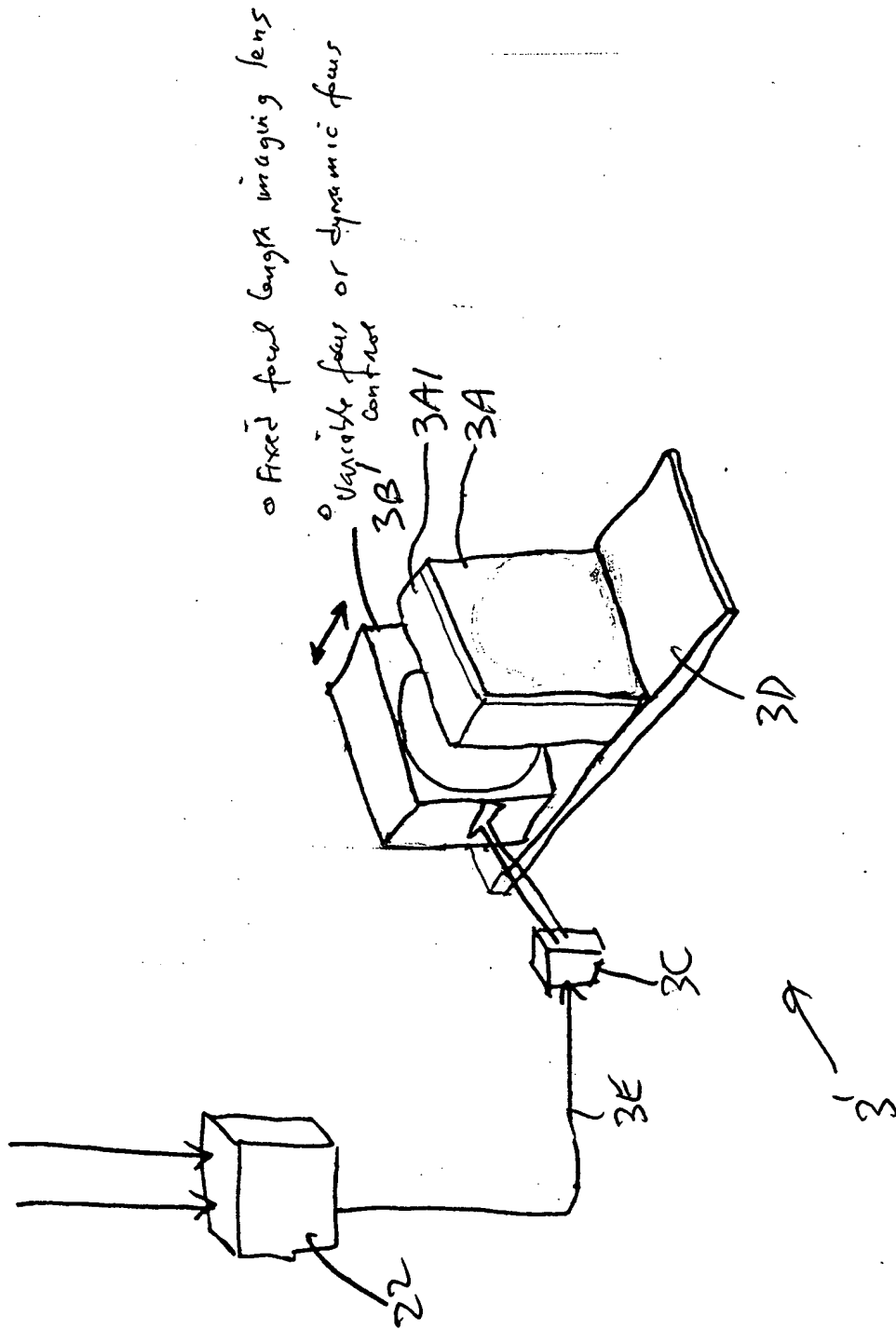


FIG. 2F3

Top Conveyor Scanner:

- fixed focal length imaging lens
- variable focal distance control

Side Conveyor Scanner:

- fixed focal length imaging lens
- dynamic focal distance control

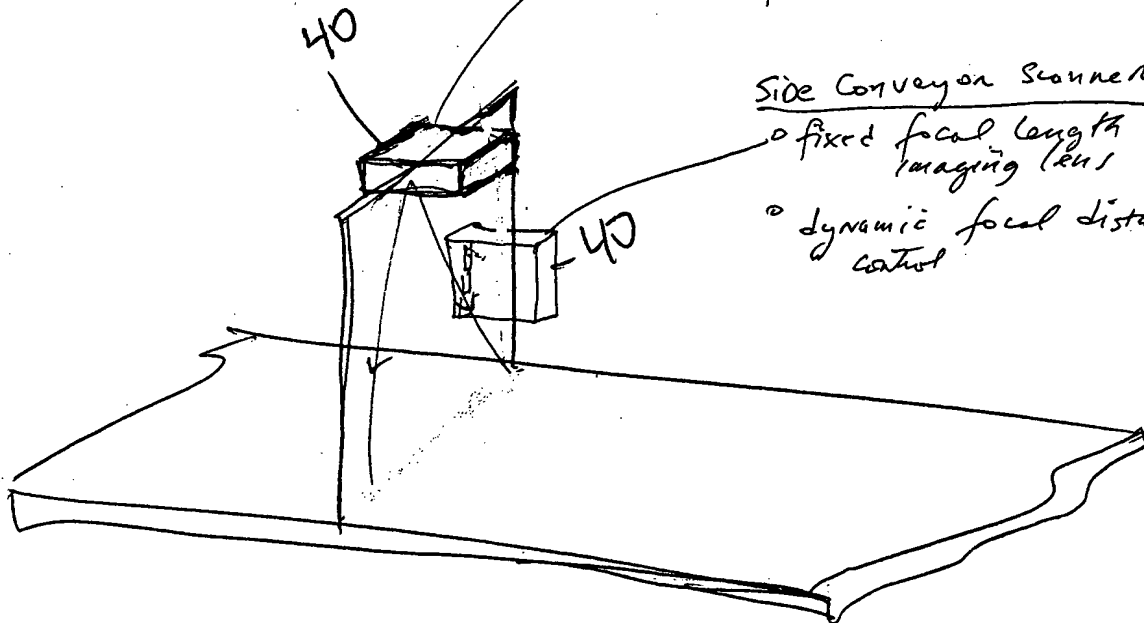


FIG. 2G

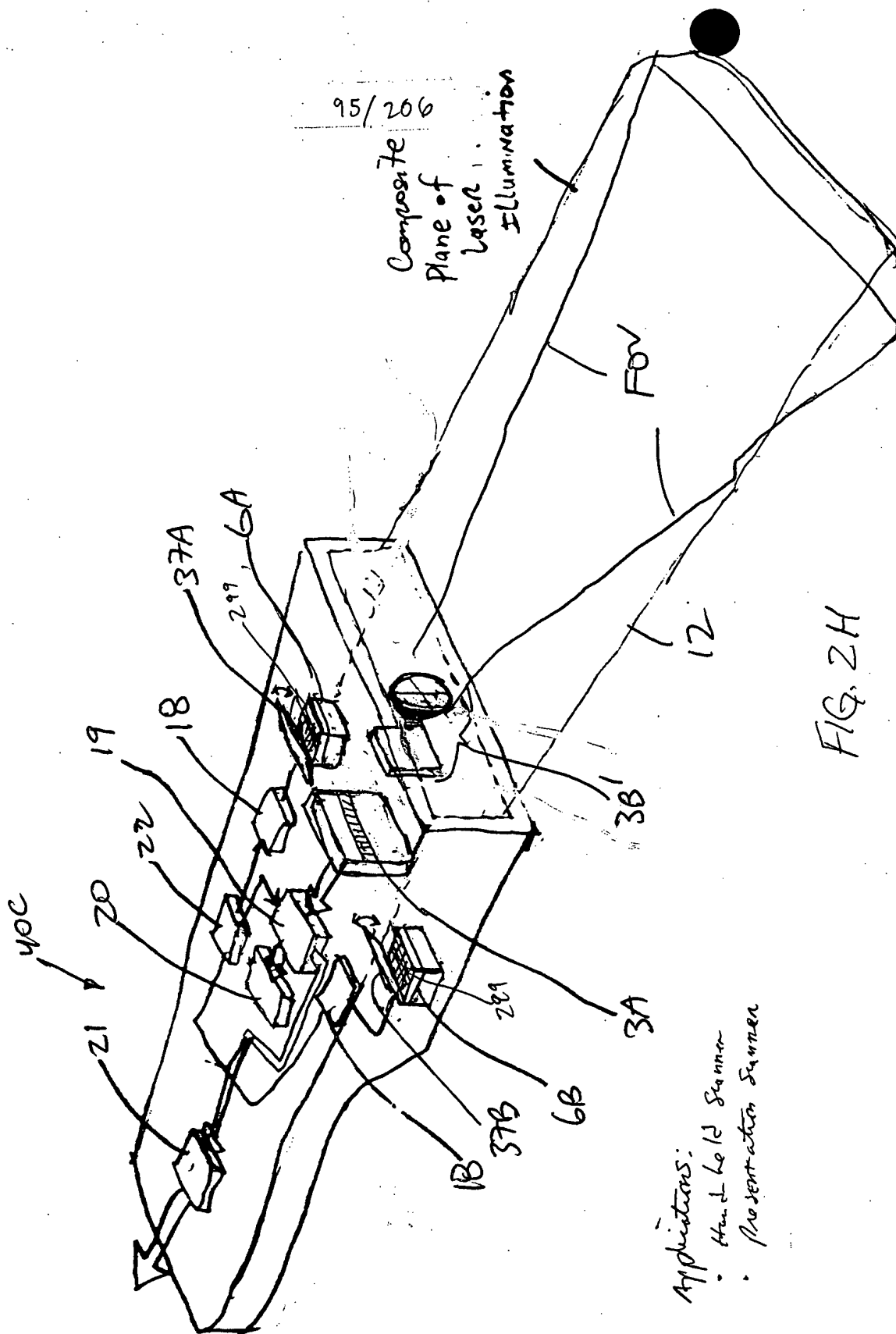


FIG. 2H

Applications:  
 • Hand Held Scanner  
 • Presentation Scanner

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 Composite  
 Plane of  
 Laser  
 Illumination

FOV

12

3B

3A

6B

37B

28A

18

37A

29, 6A

19

18

22

20

21

40C



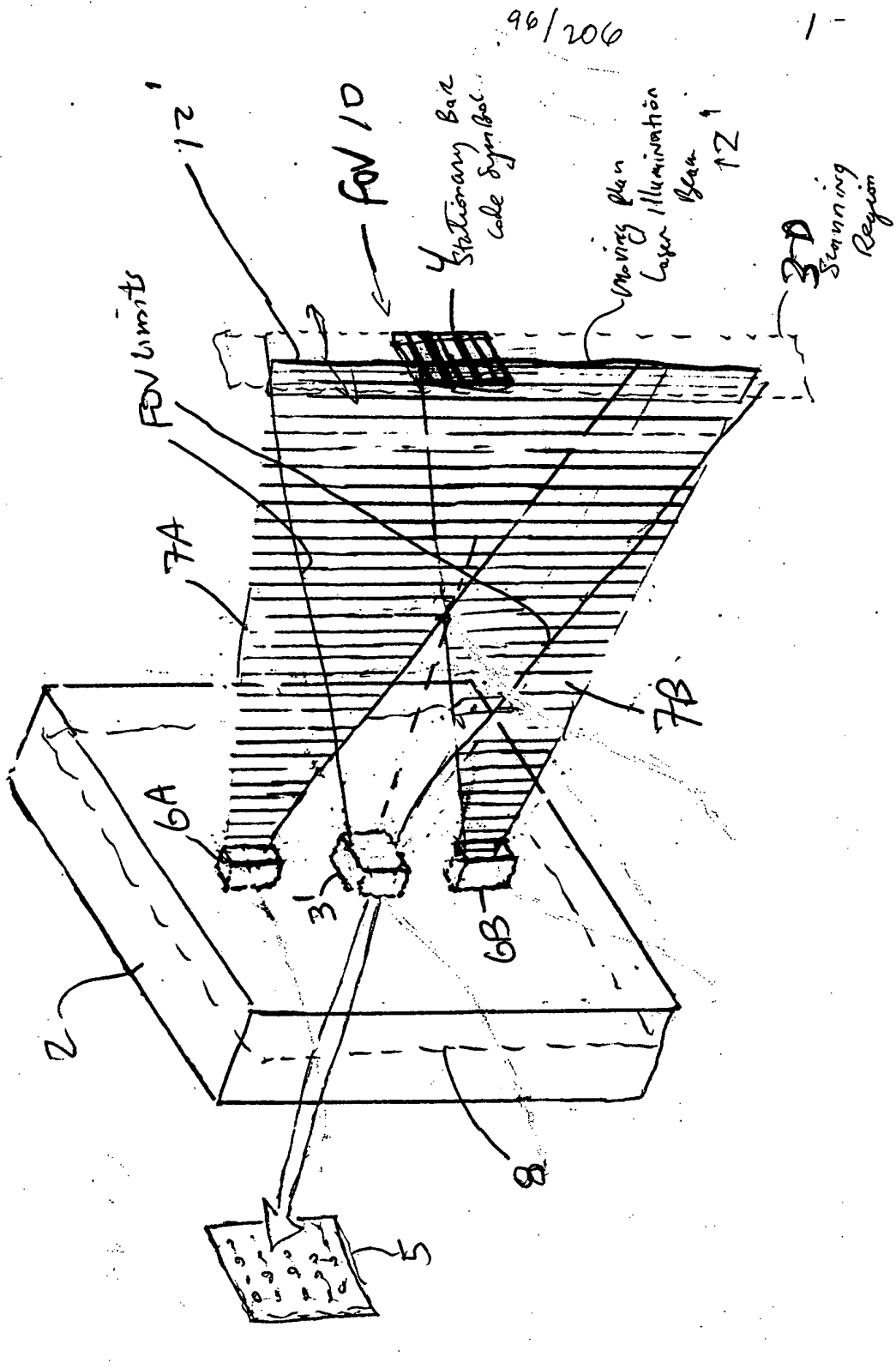
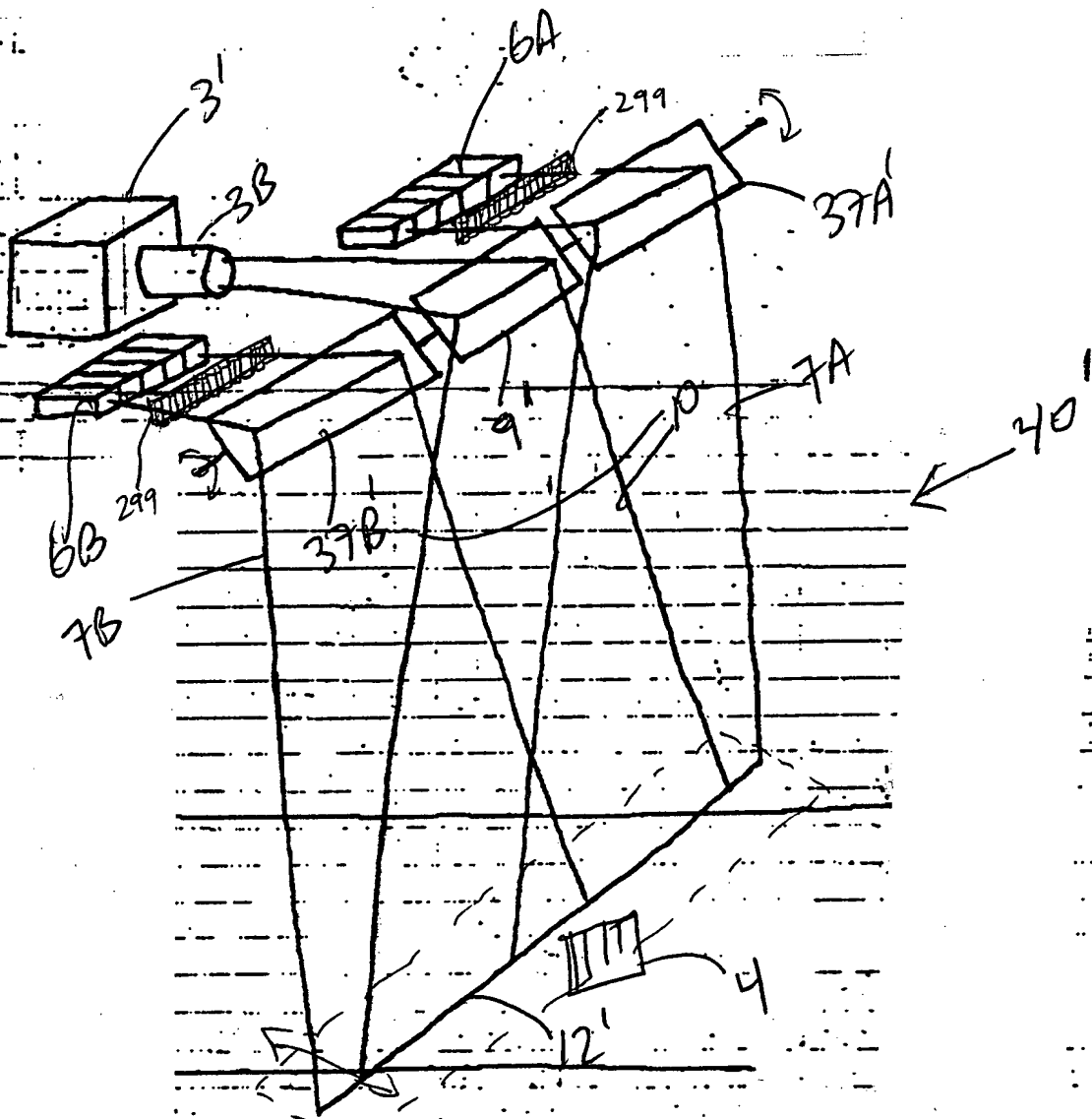


FIG. 21

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3-D  
Scanning  
Region

FIG 2I2

1

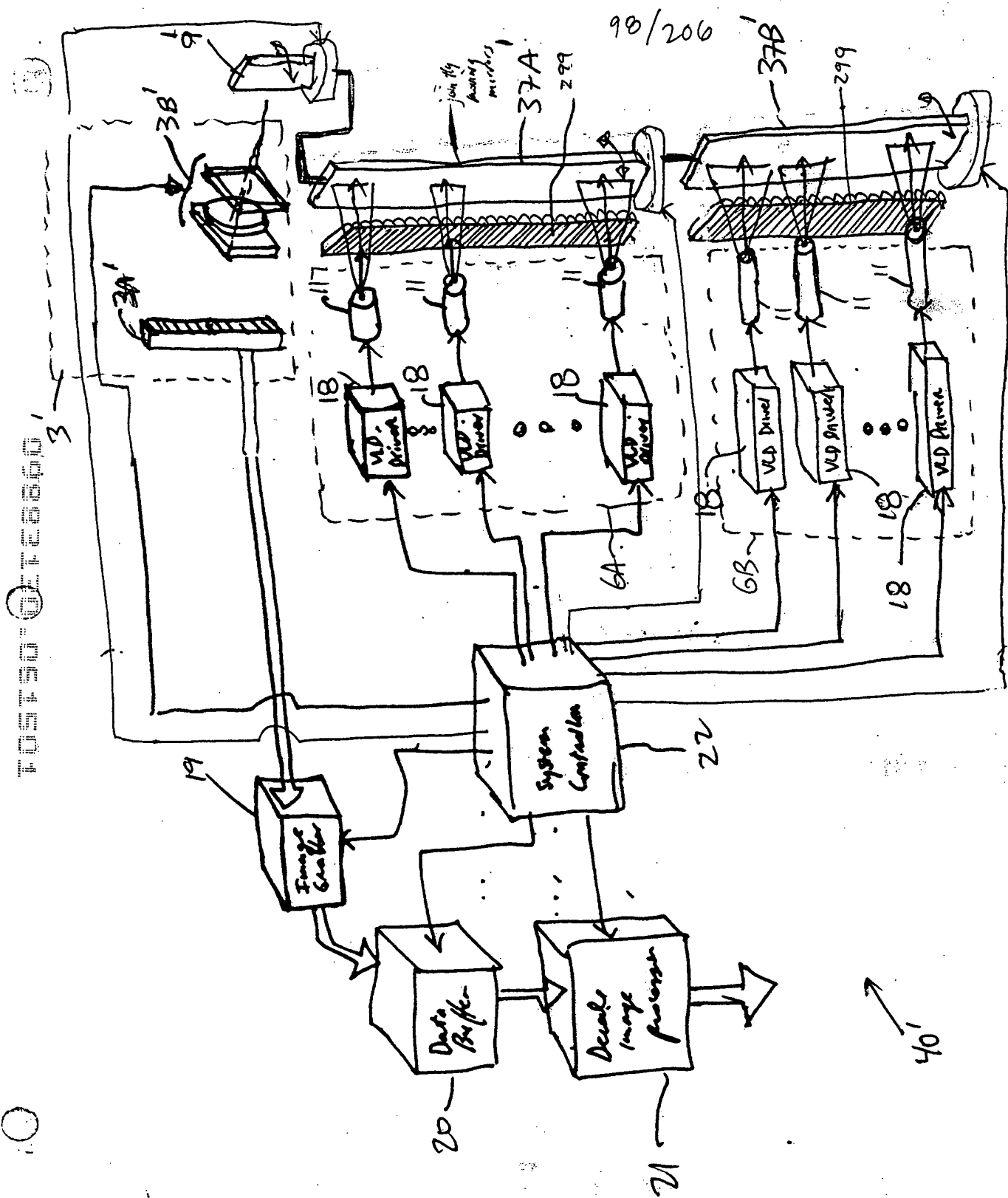
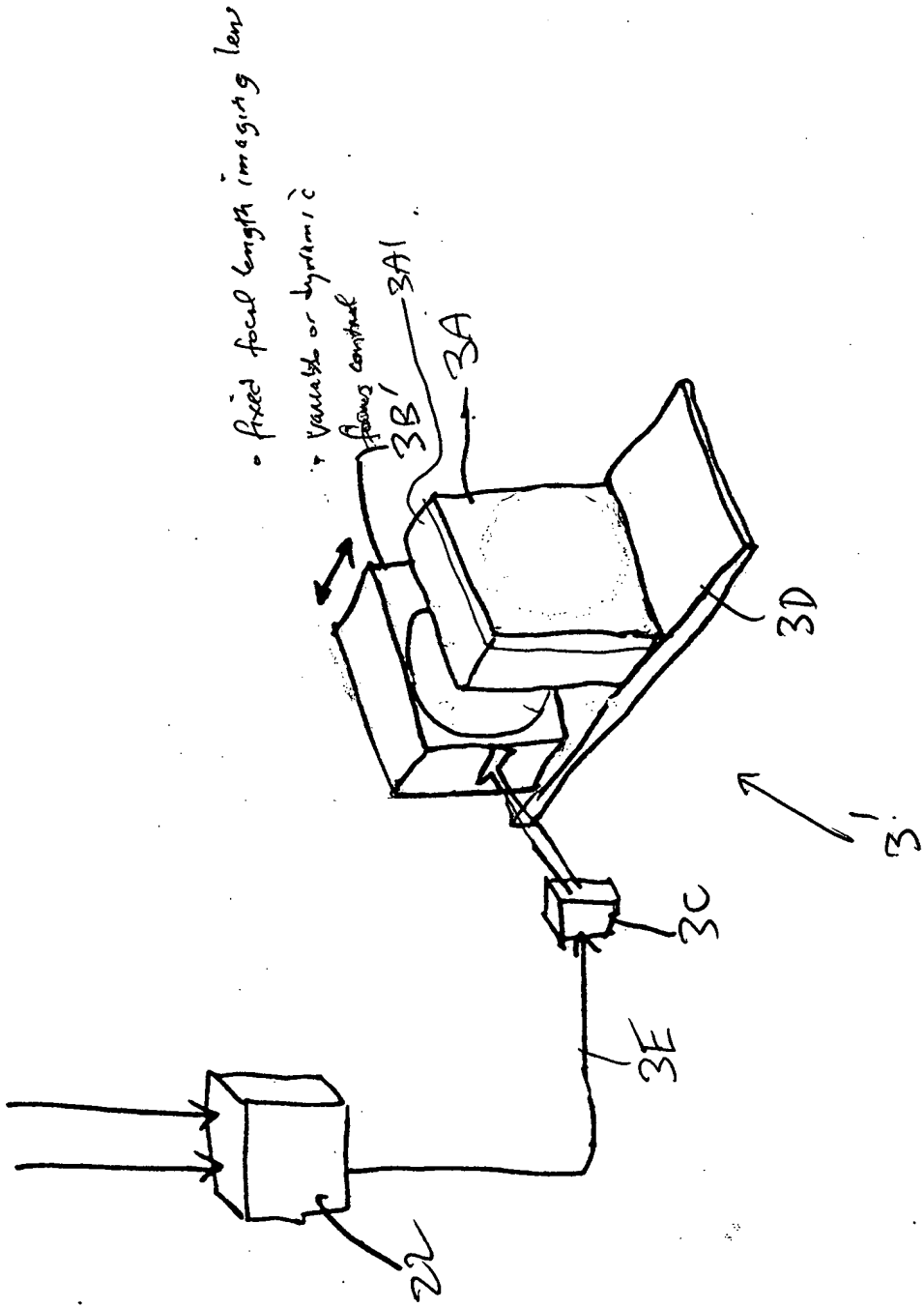


FIG. 213

FOOTNOTES

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fixed focal length imaging lens  
variable or hydraulic  
flange control

FIG. 2I4

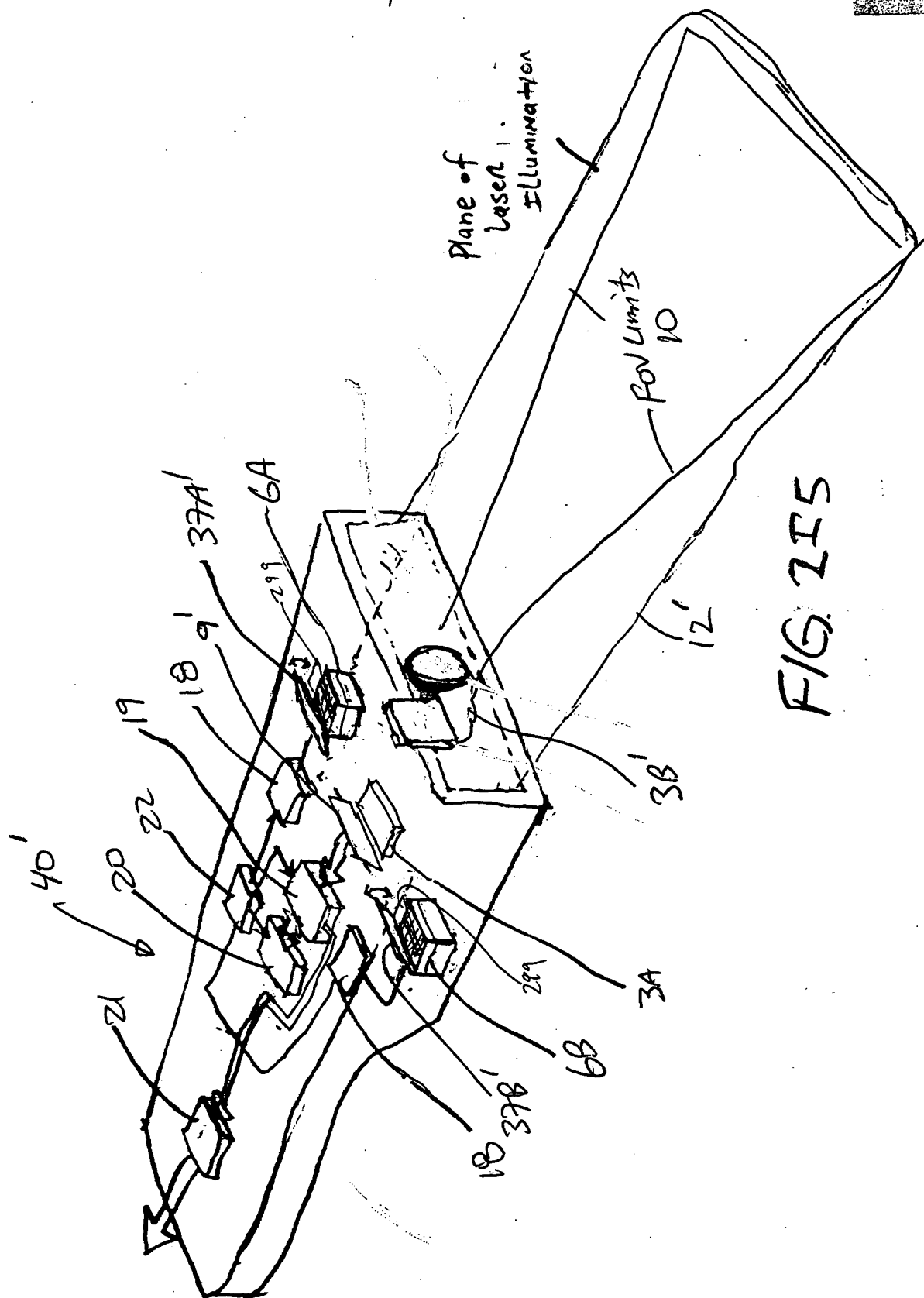


FIG. 215

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FIG. 216

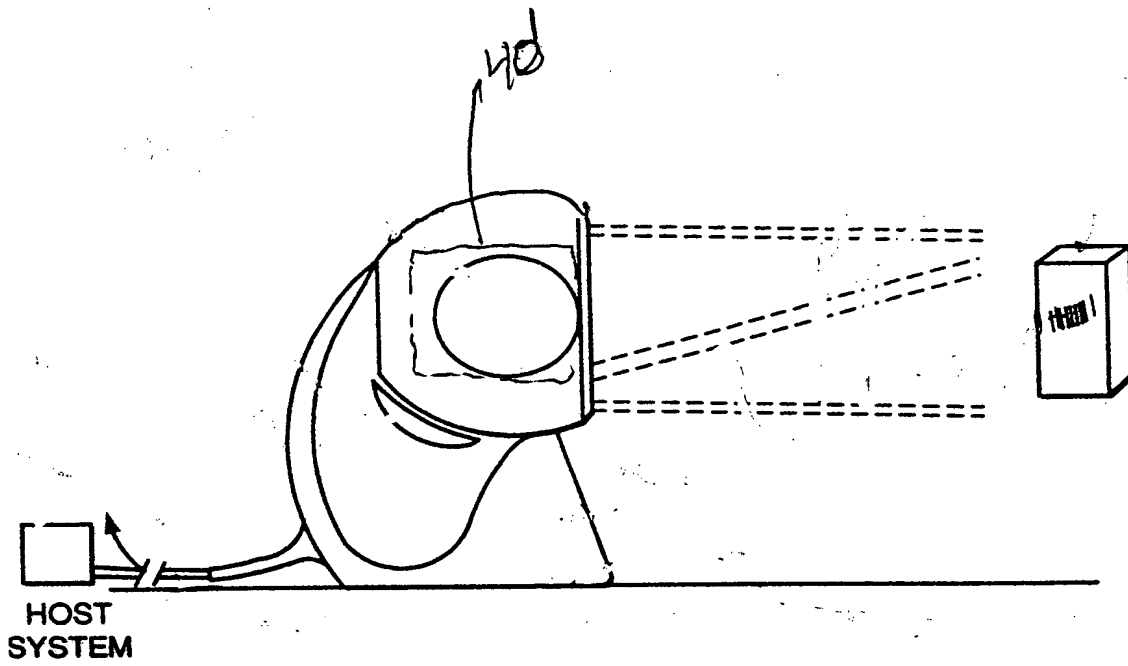


FIG. 216



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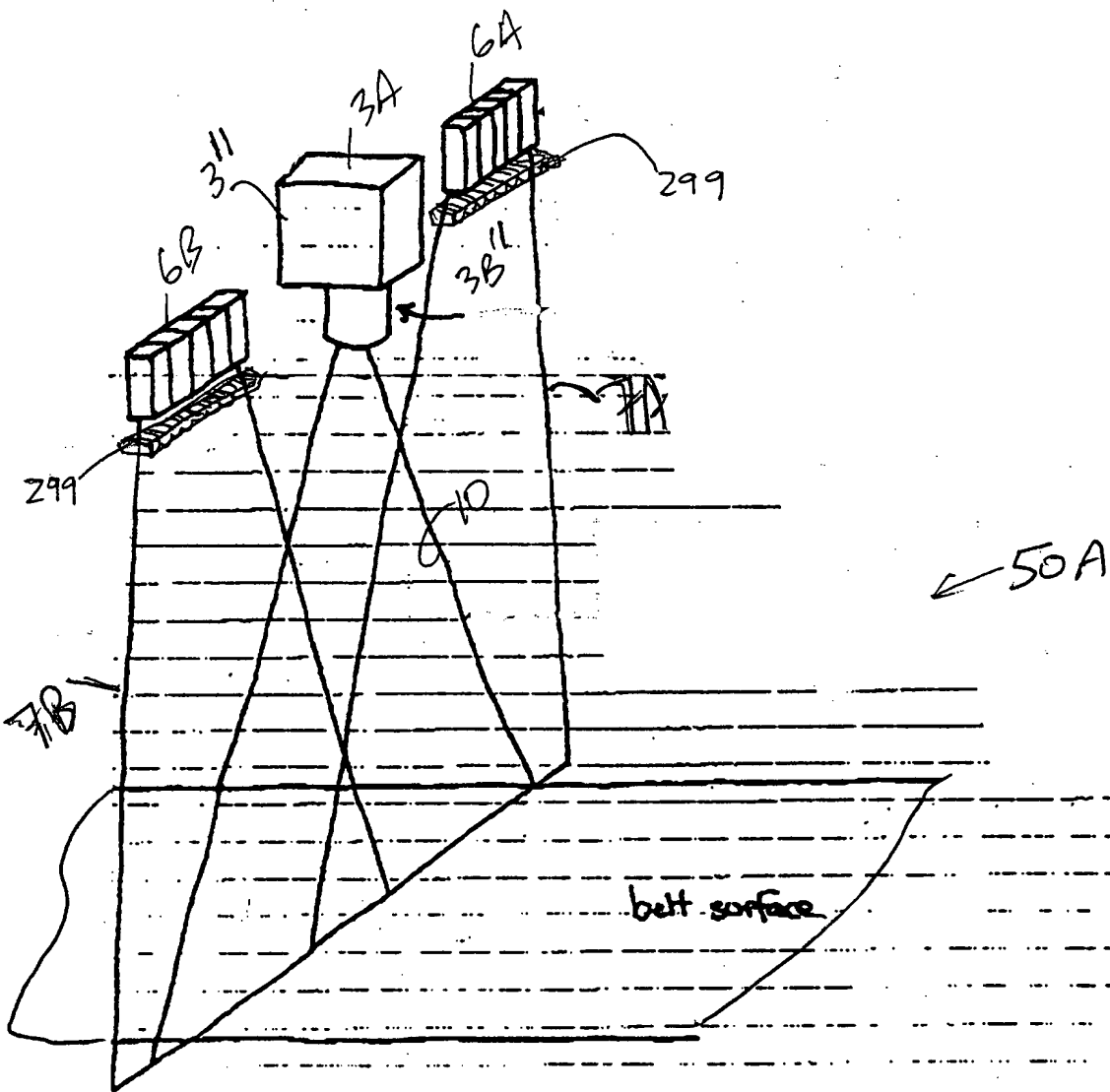


FIG. 3B1



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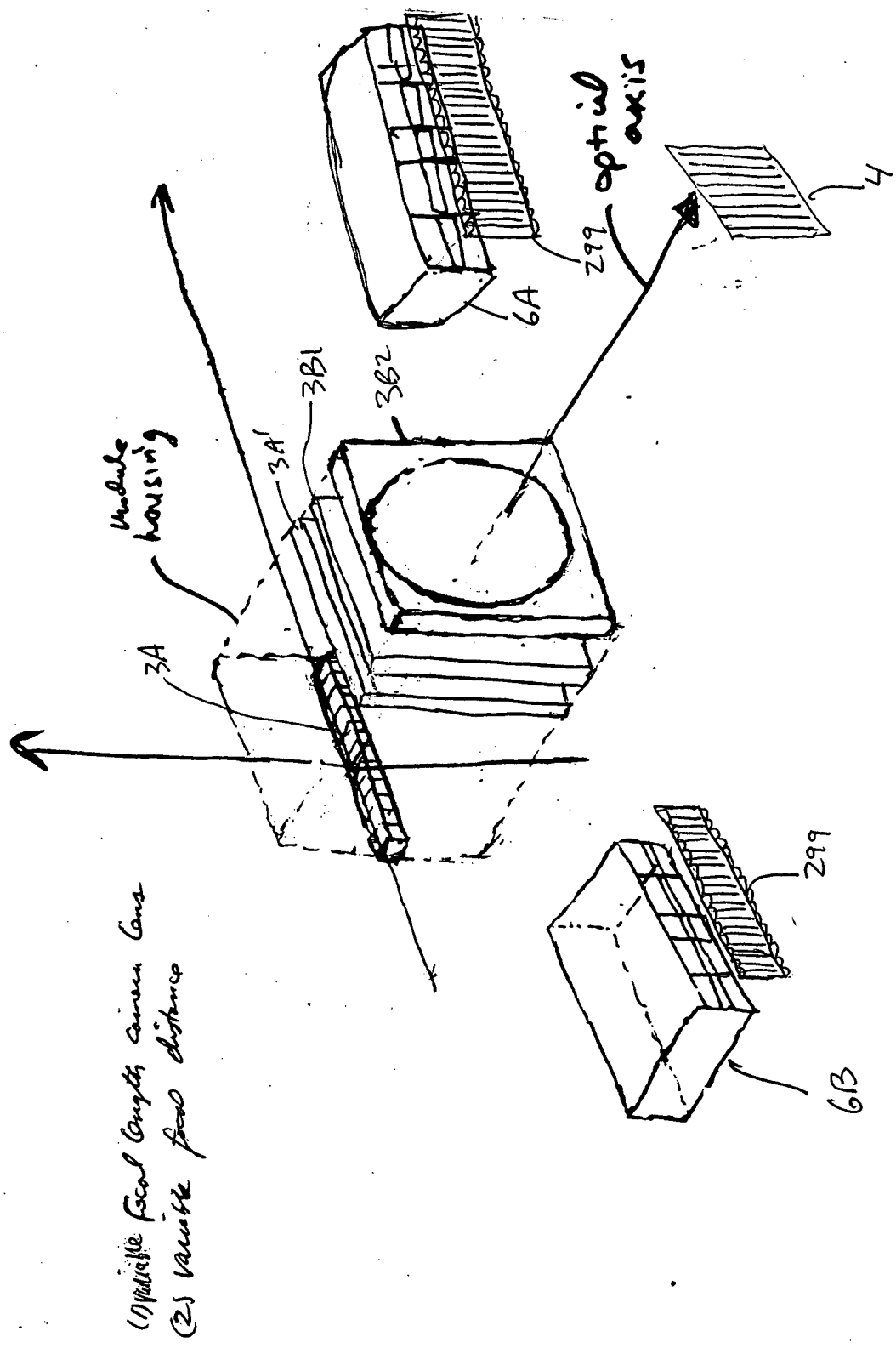
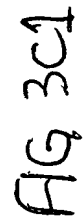


FIG. 3B2

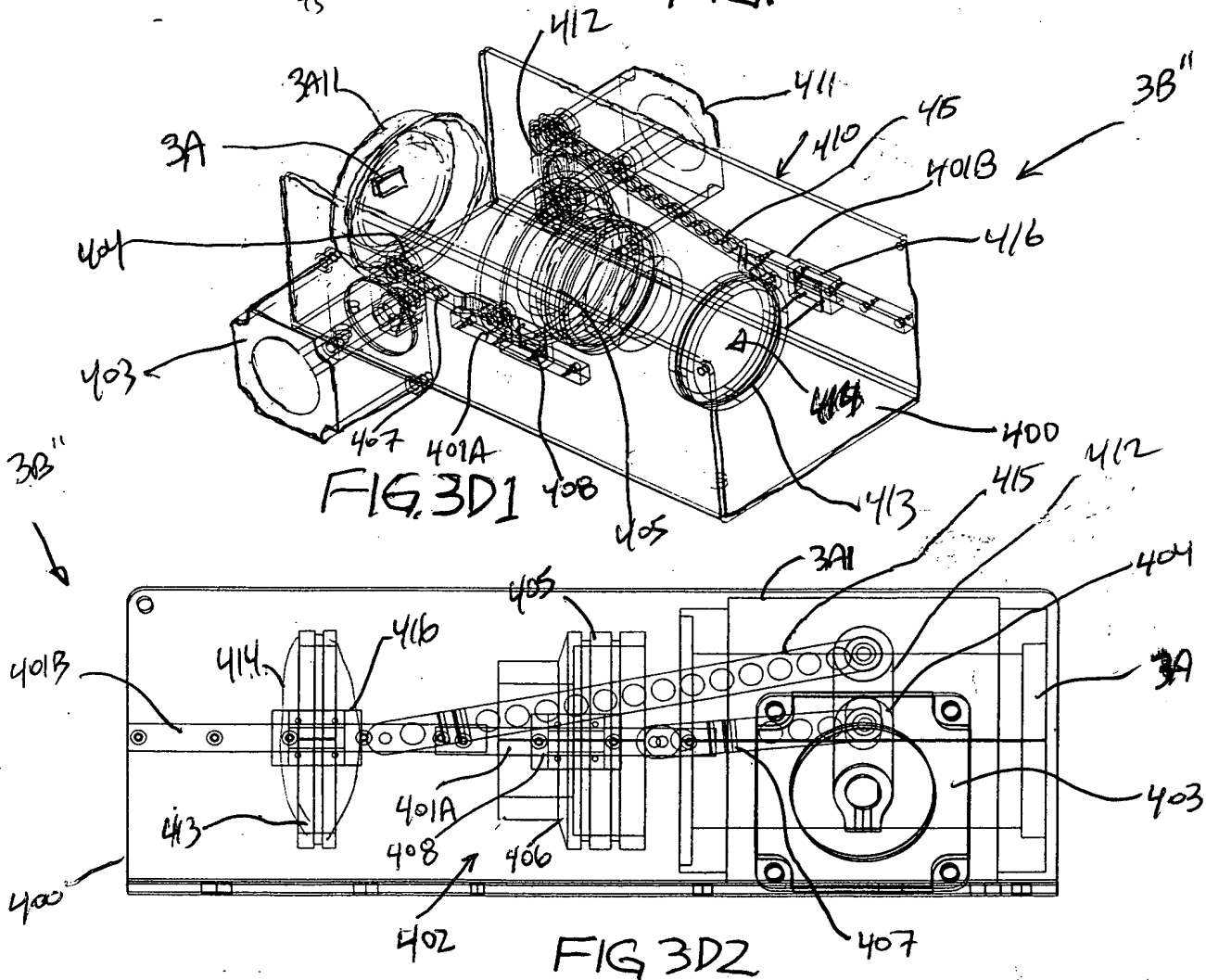
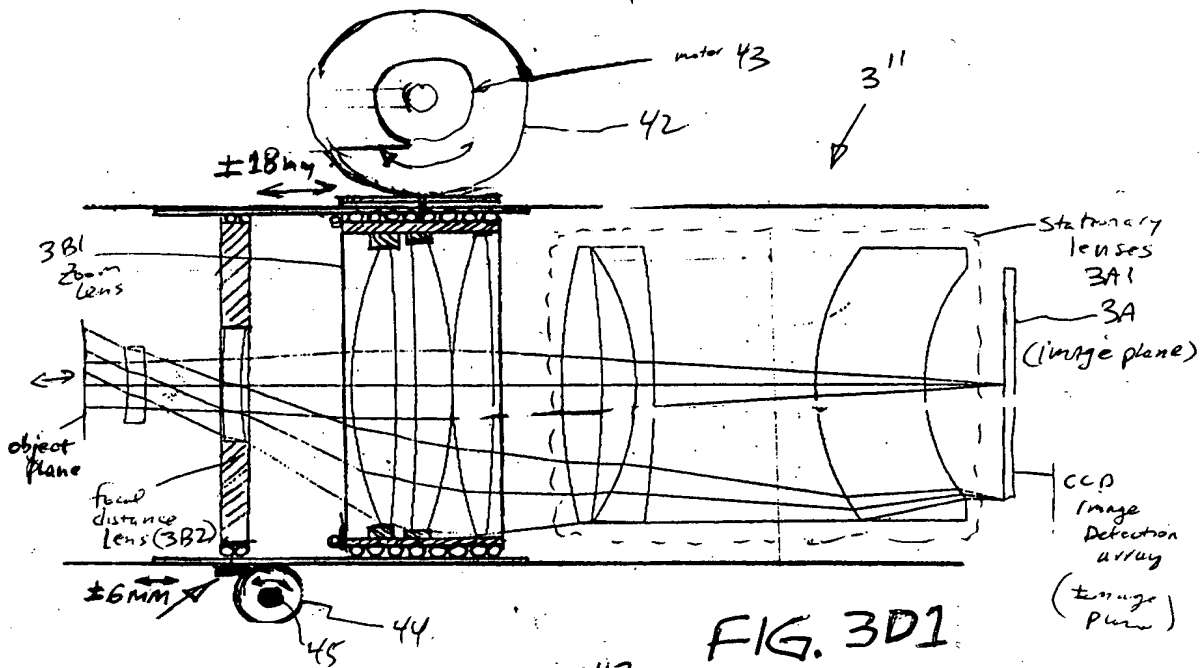
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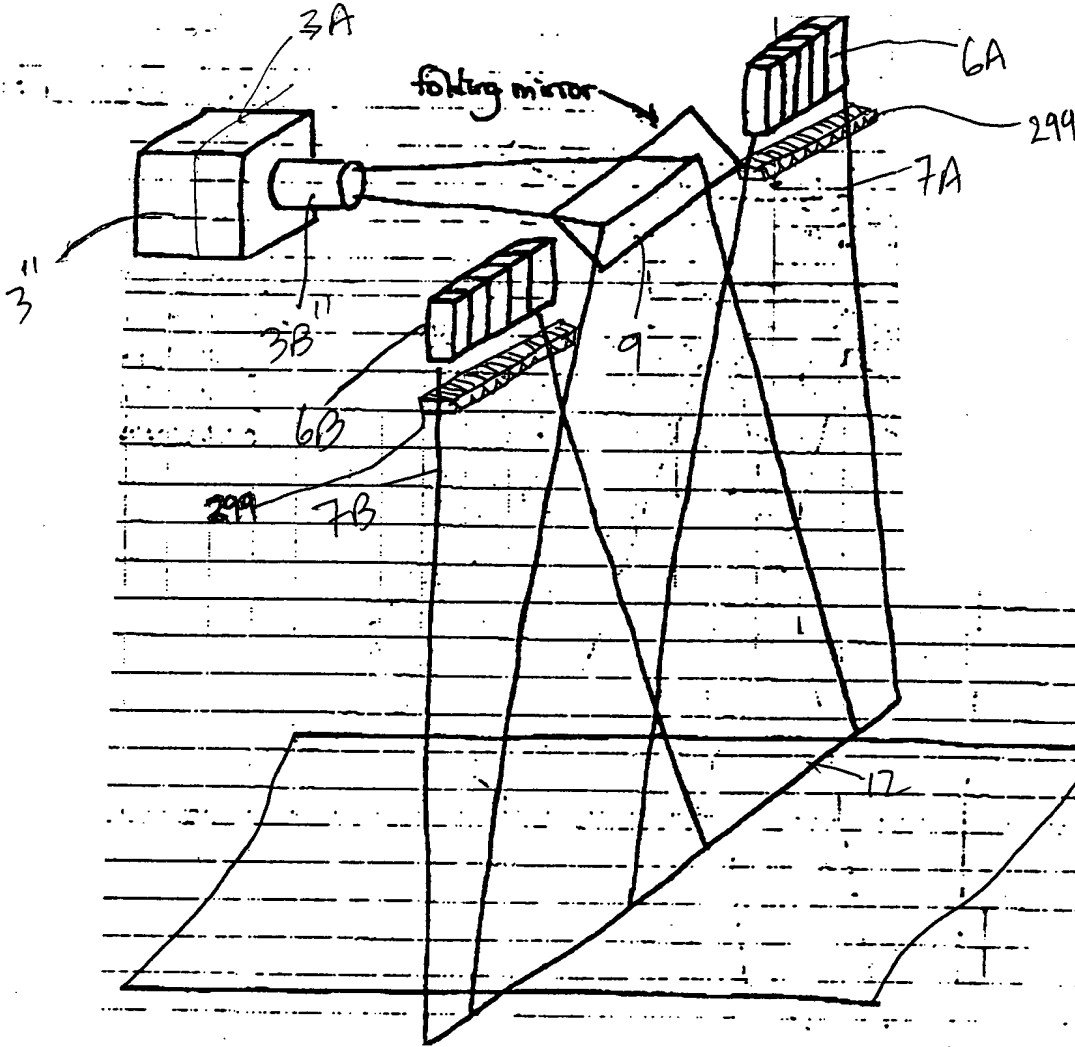
As



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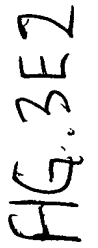


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503

FIG. 3E1

[illegible]

50B →

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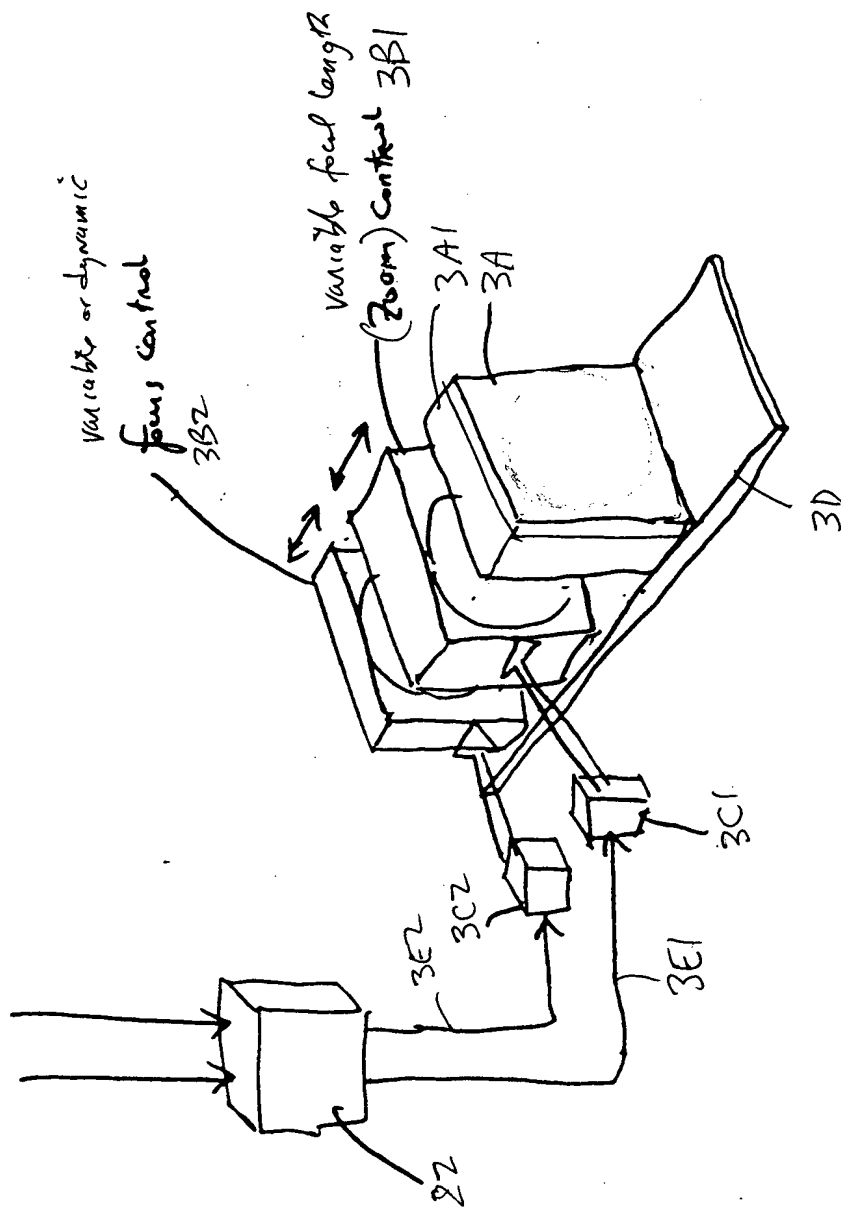


FIG. 3E3

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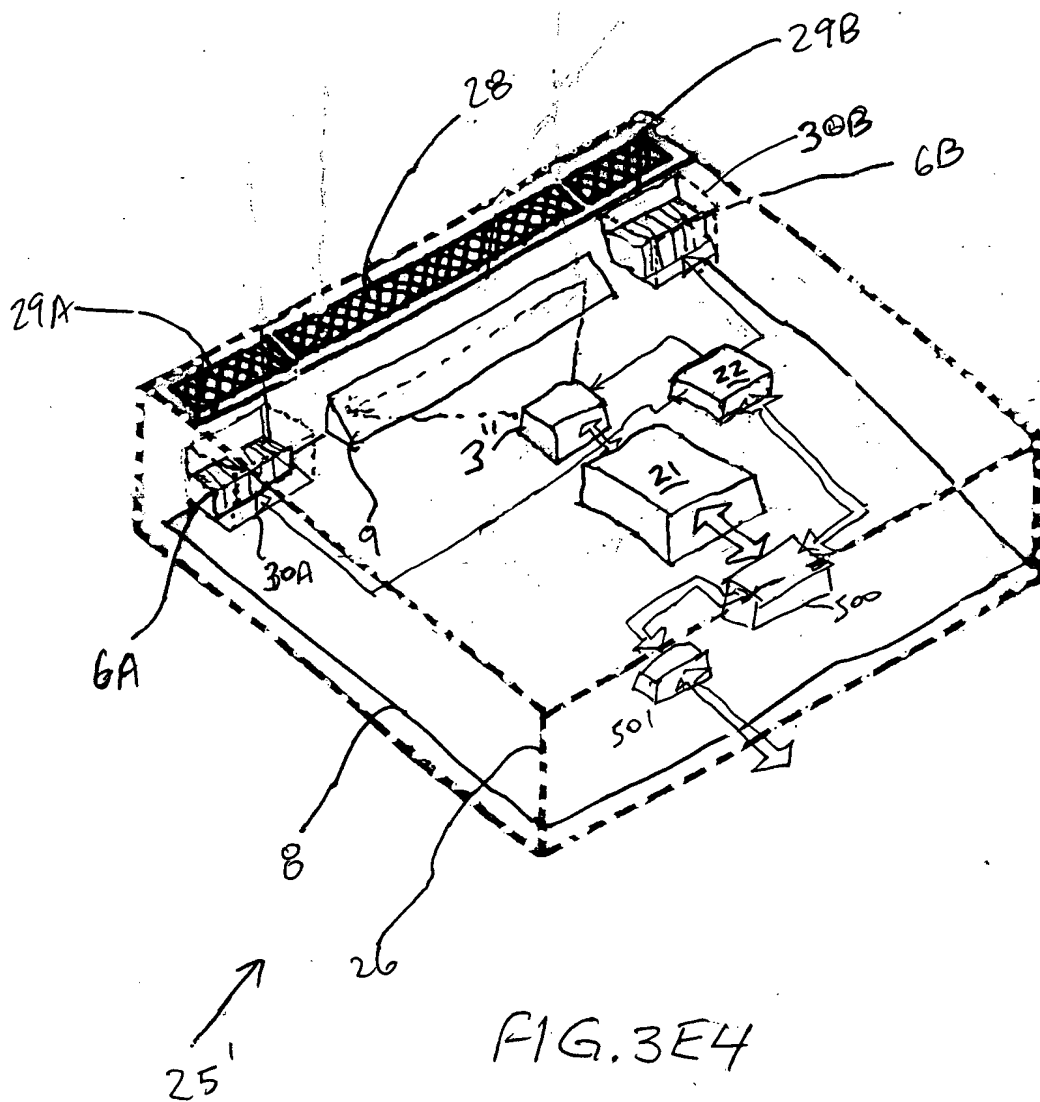


FIG. 3E4



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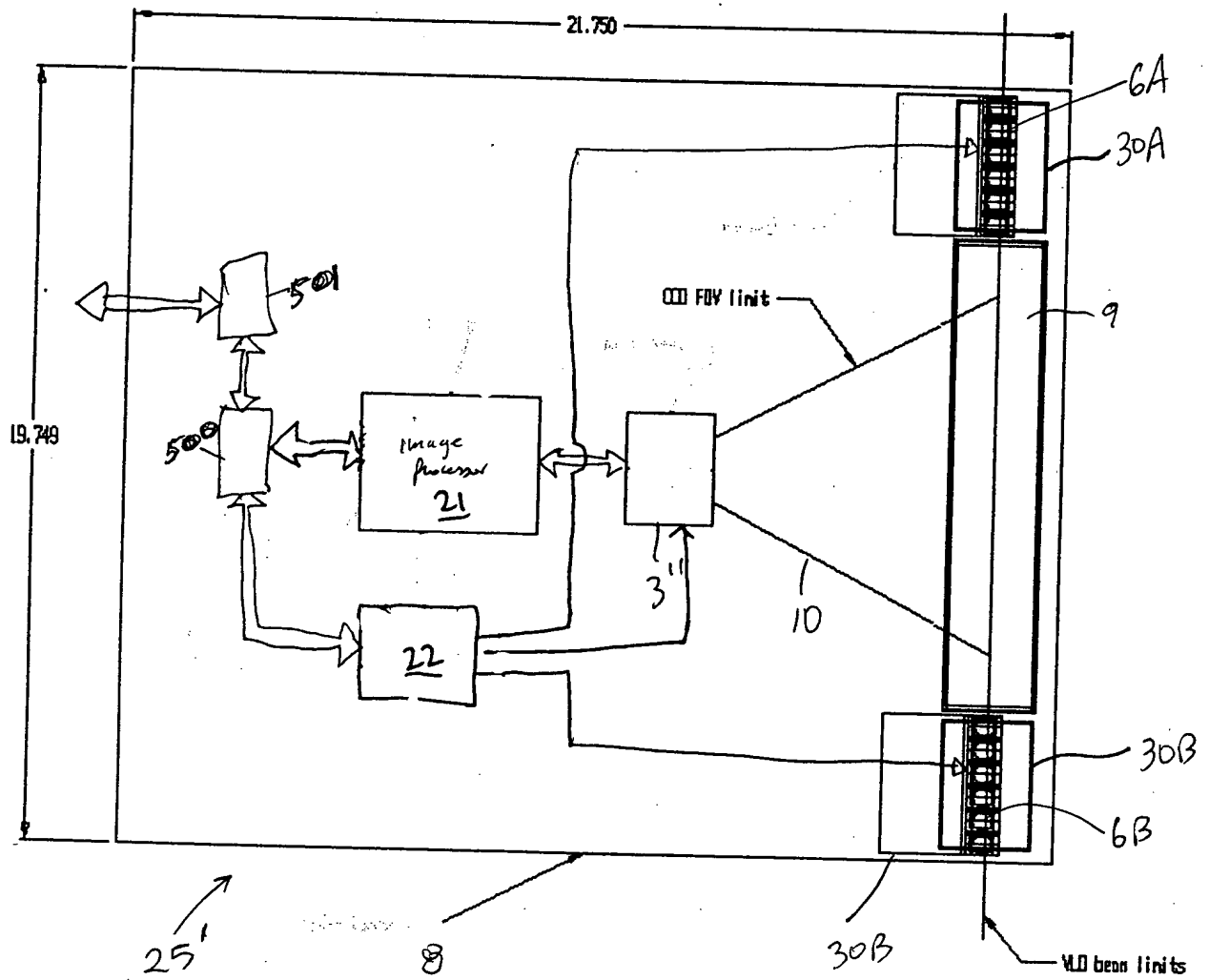


FIG. 3E5

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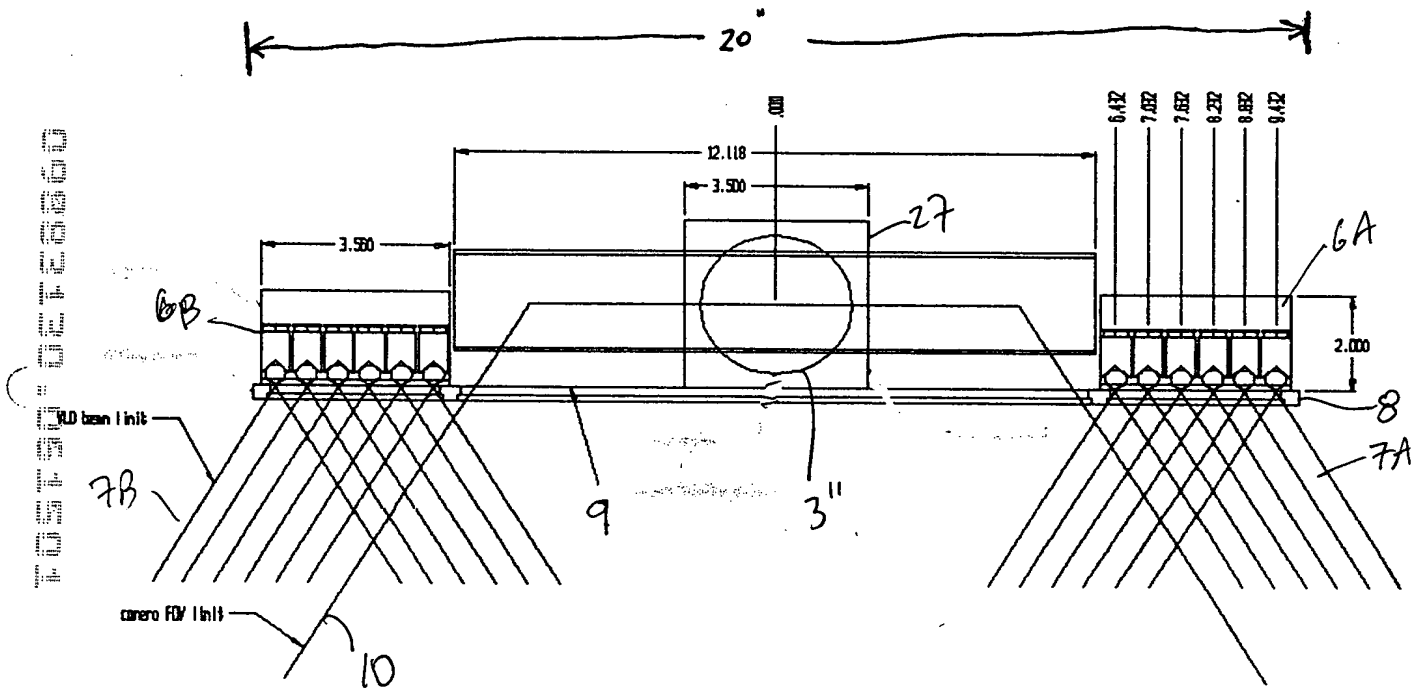


FIG. 3E6

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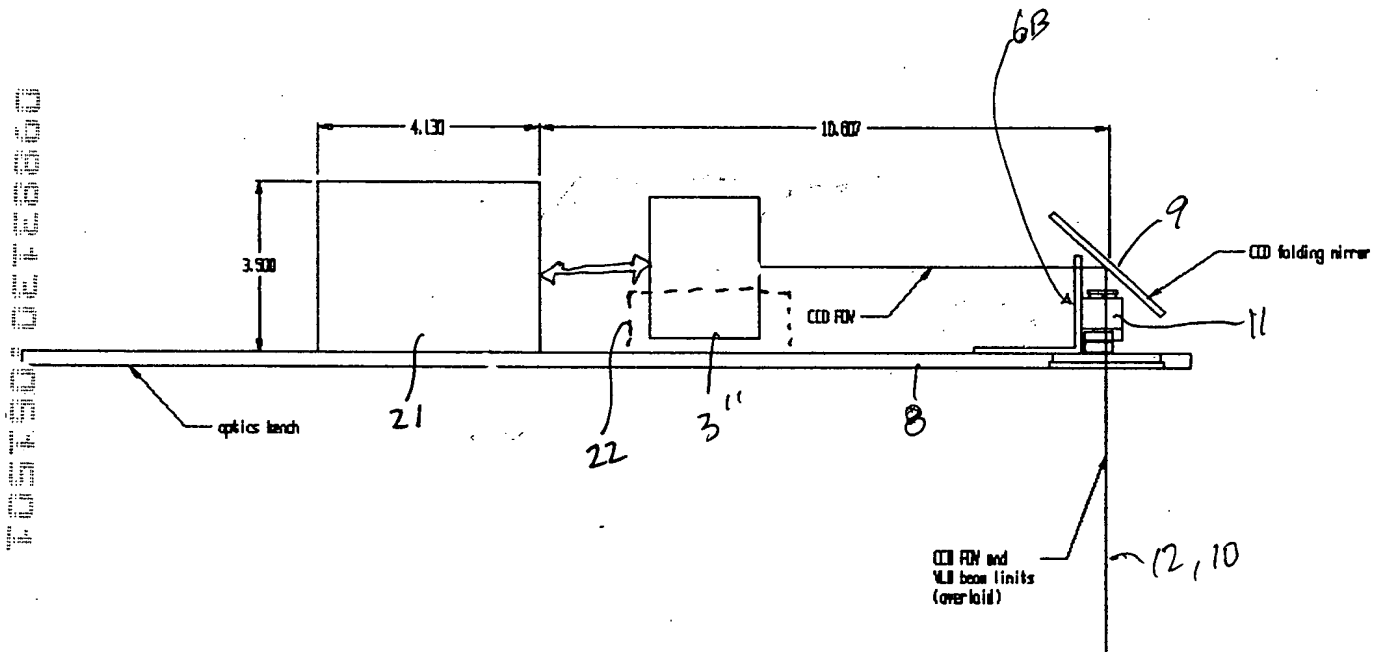


FIG. 3E7

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\*Variable FOV

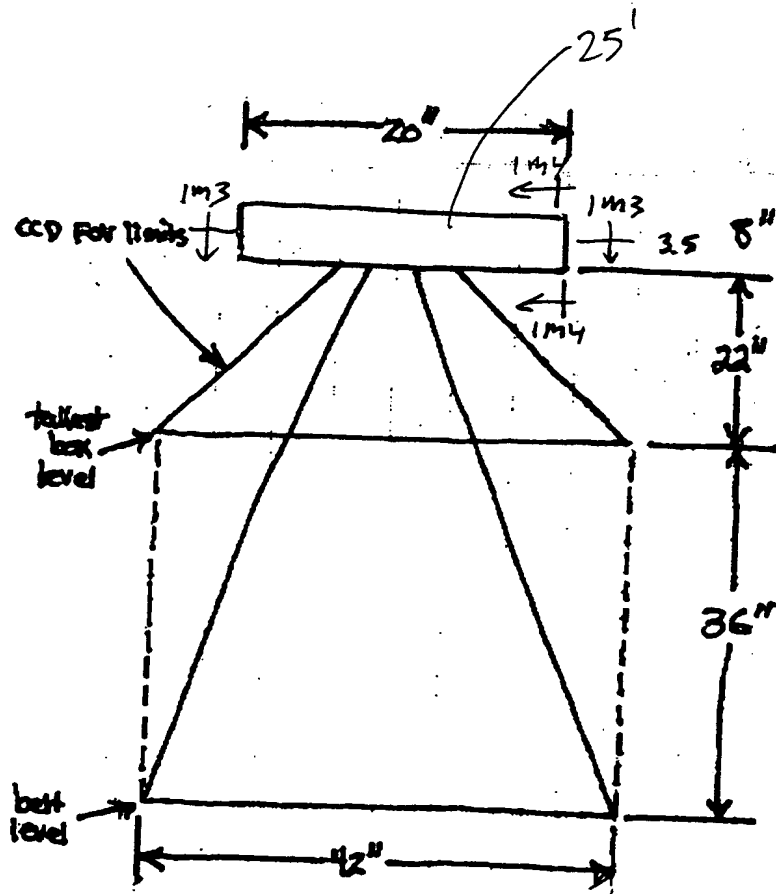


FIG. 3E8

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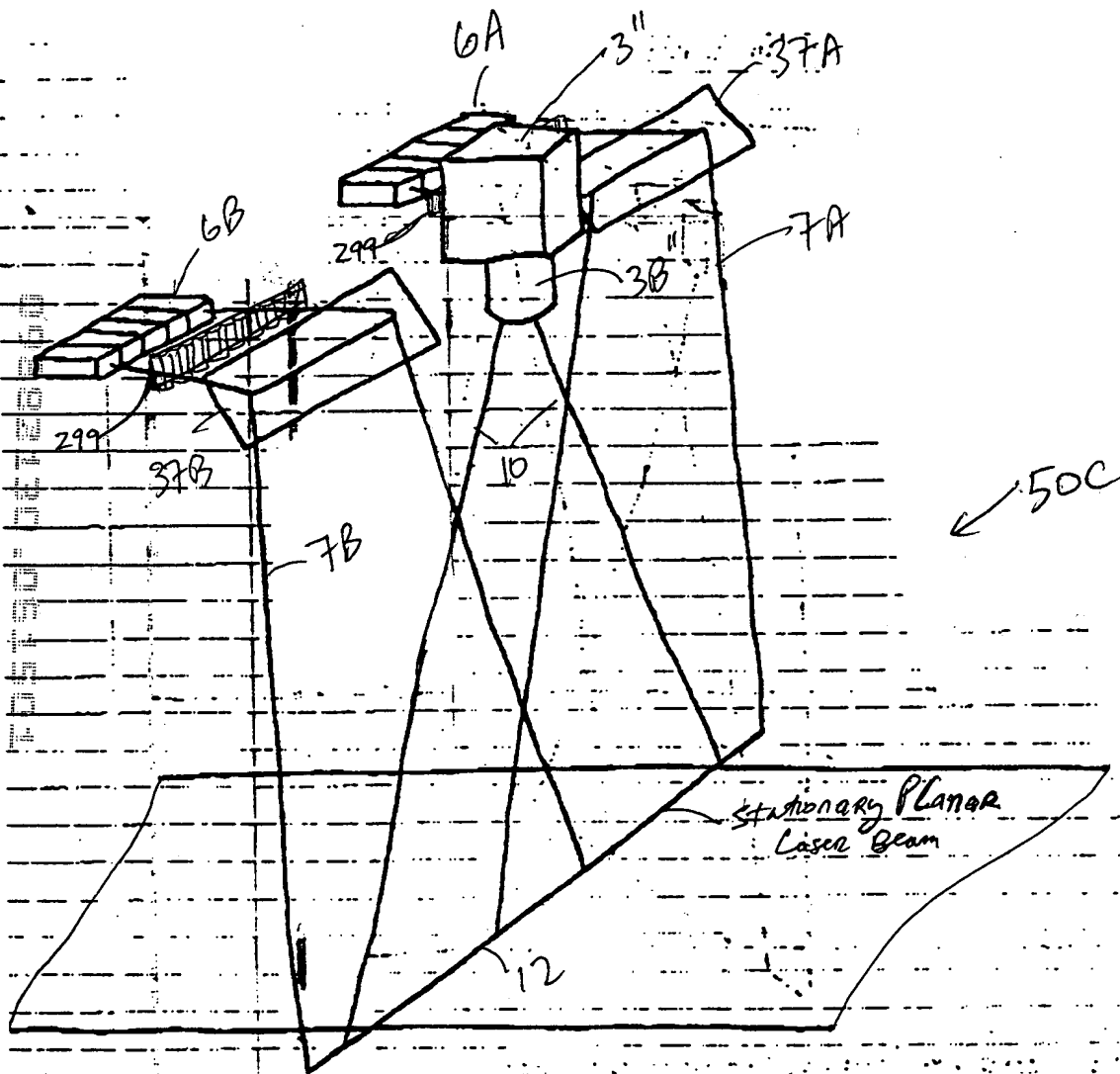


FIG. 3F1

FOOTNOTES

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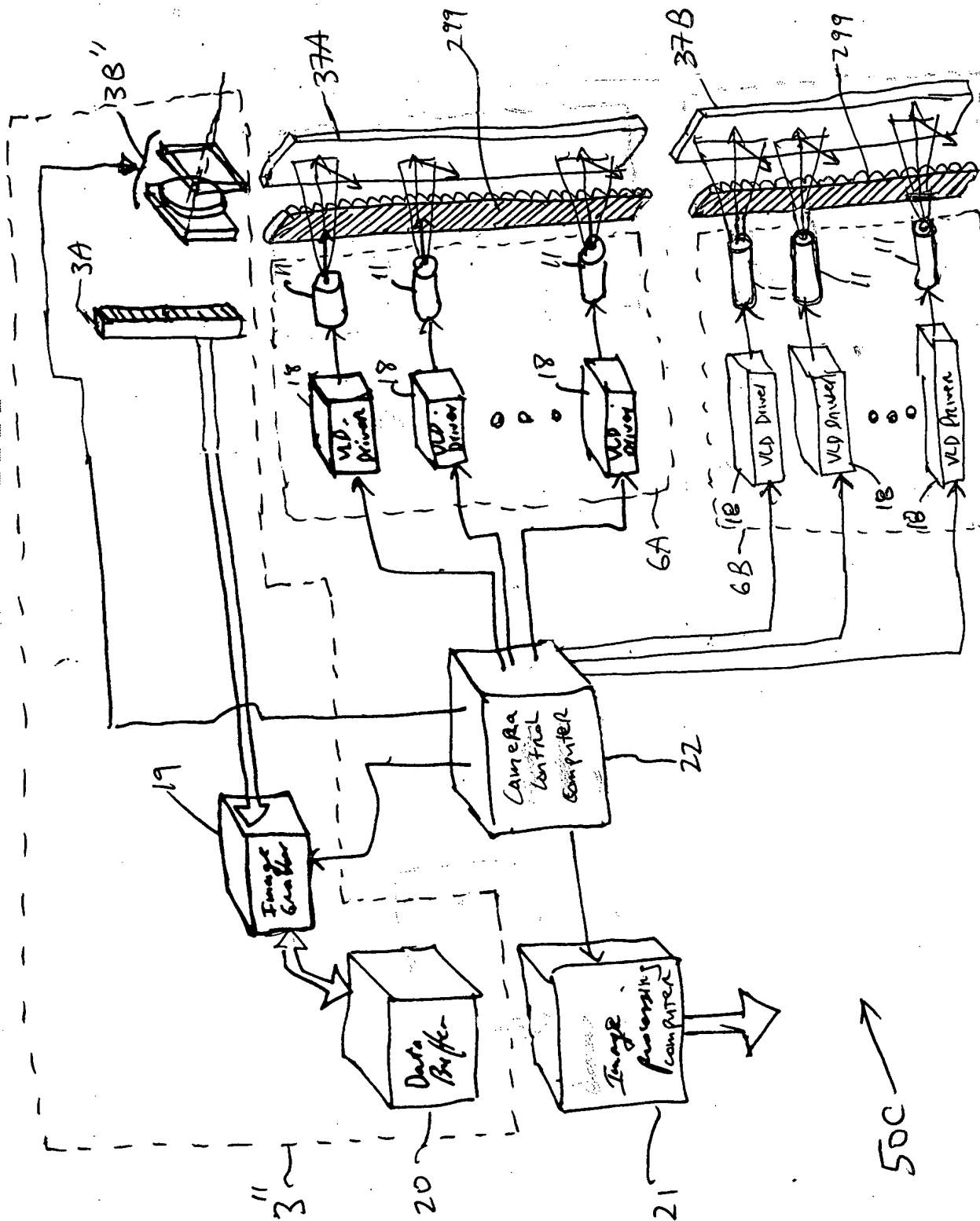


FIG. 3F2

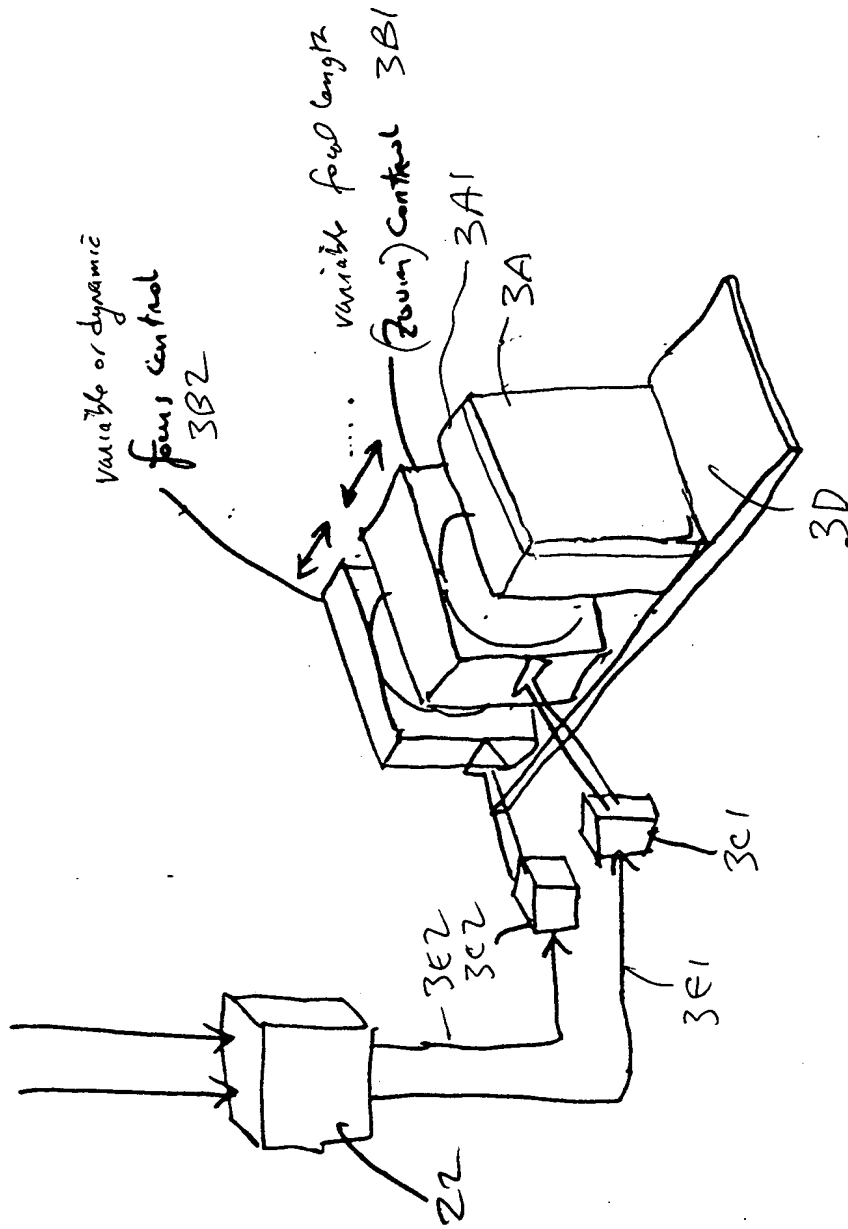


FIG. 3F3

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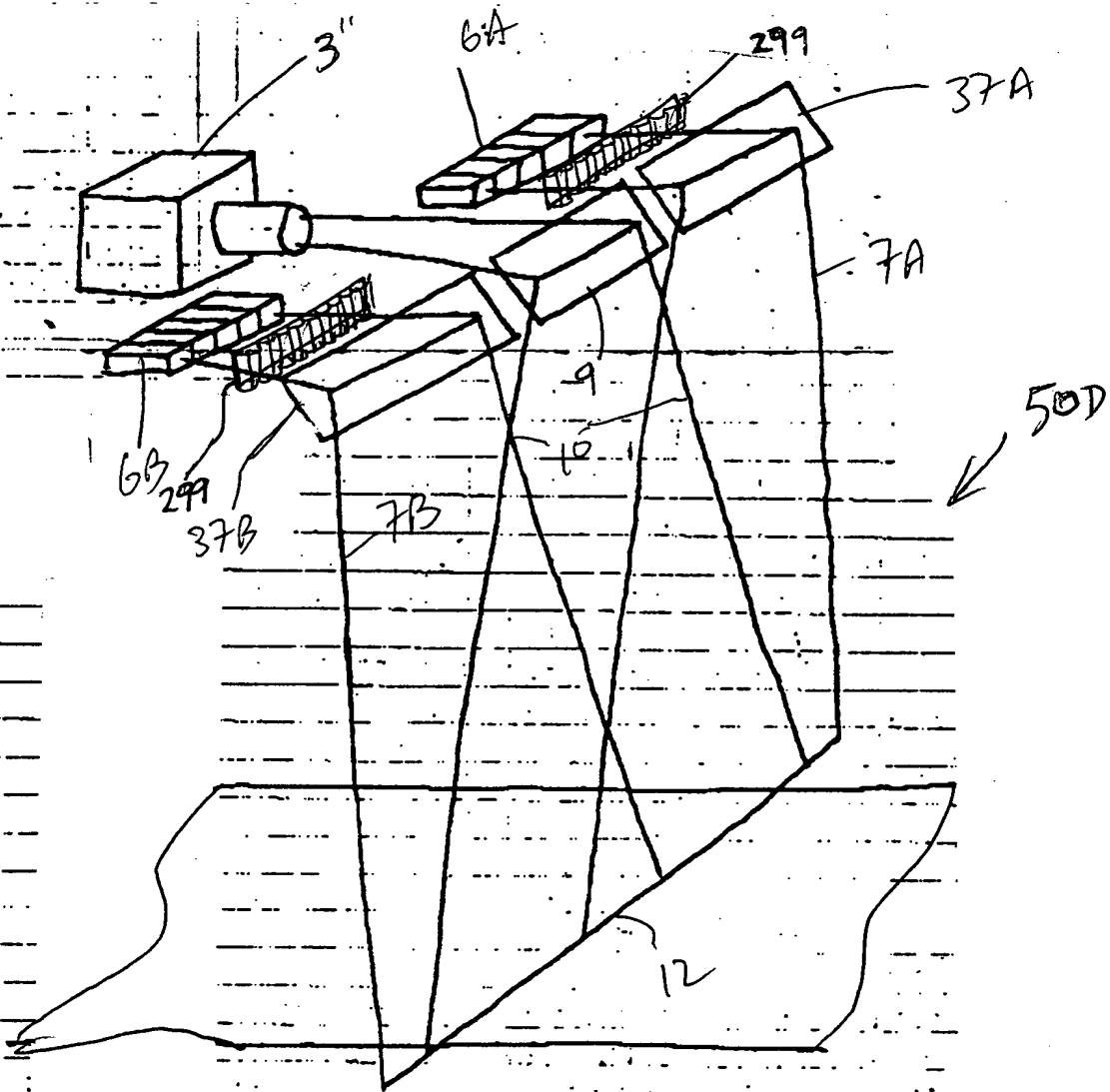


FIG 3G1



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50

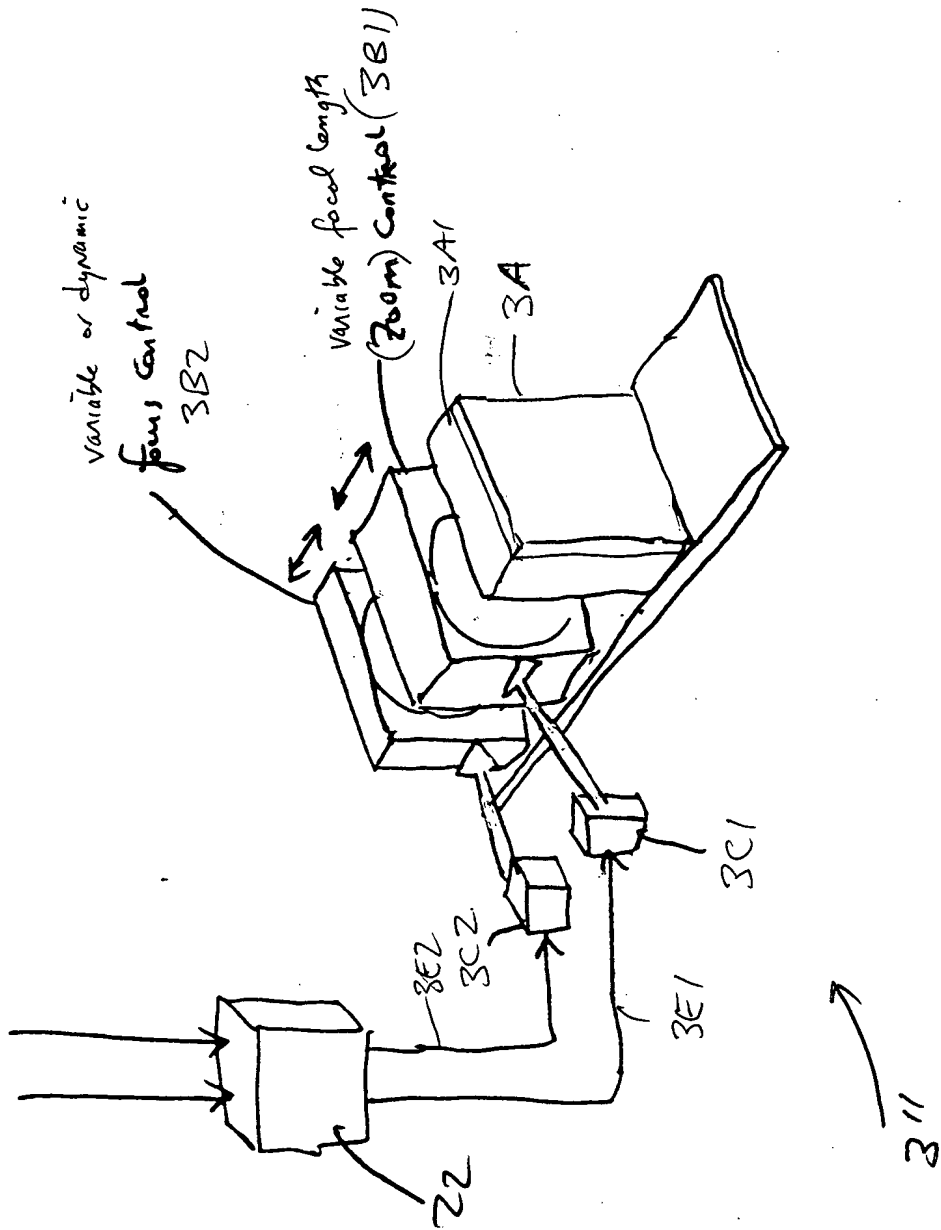


FIG. 3Q3

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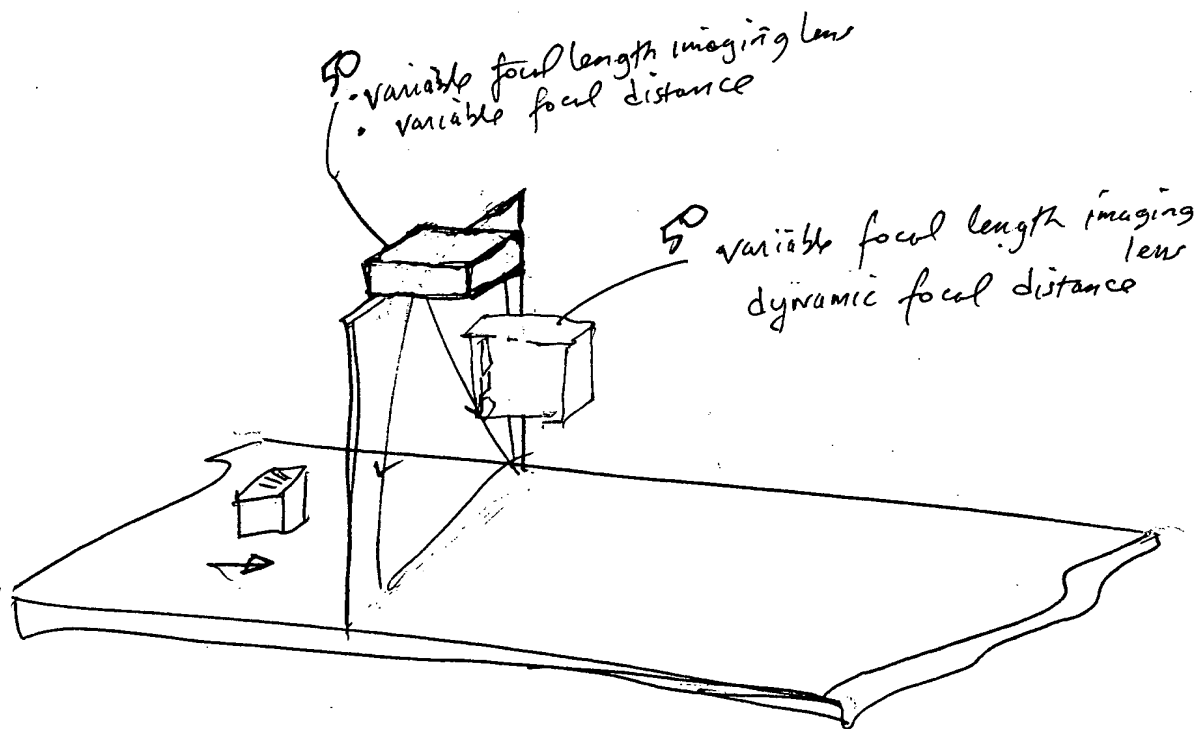


FIG. 3H

50D

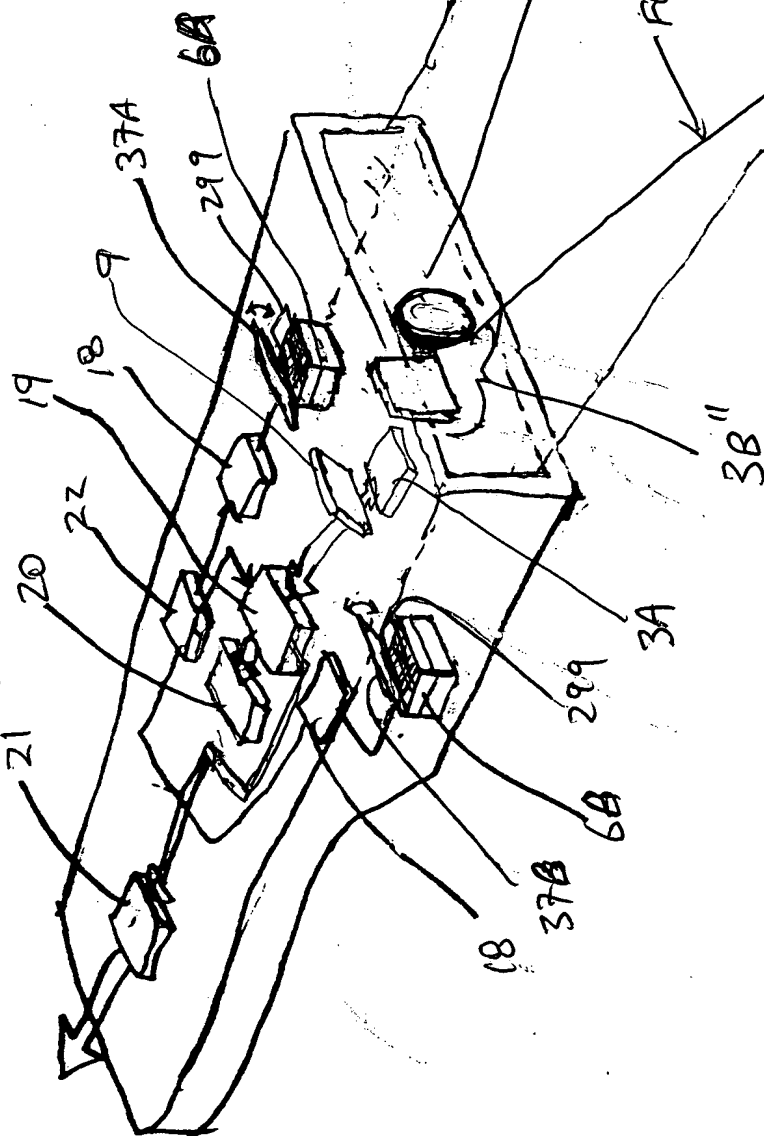
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Composite  
Plane of  
Laser  
Illumination

12

FOV Limits  
(10)

FIG. 3I



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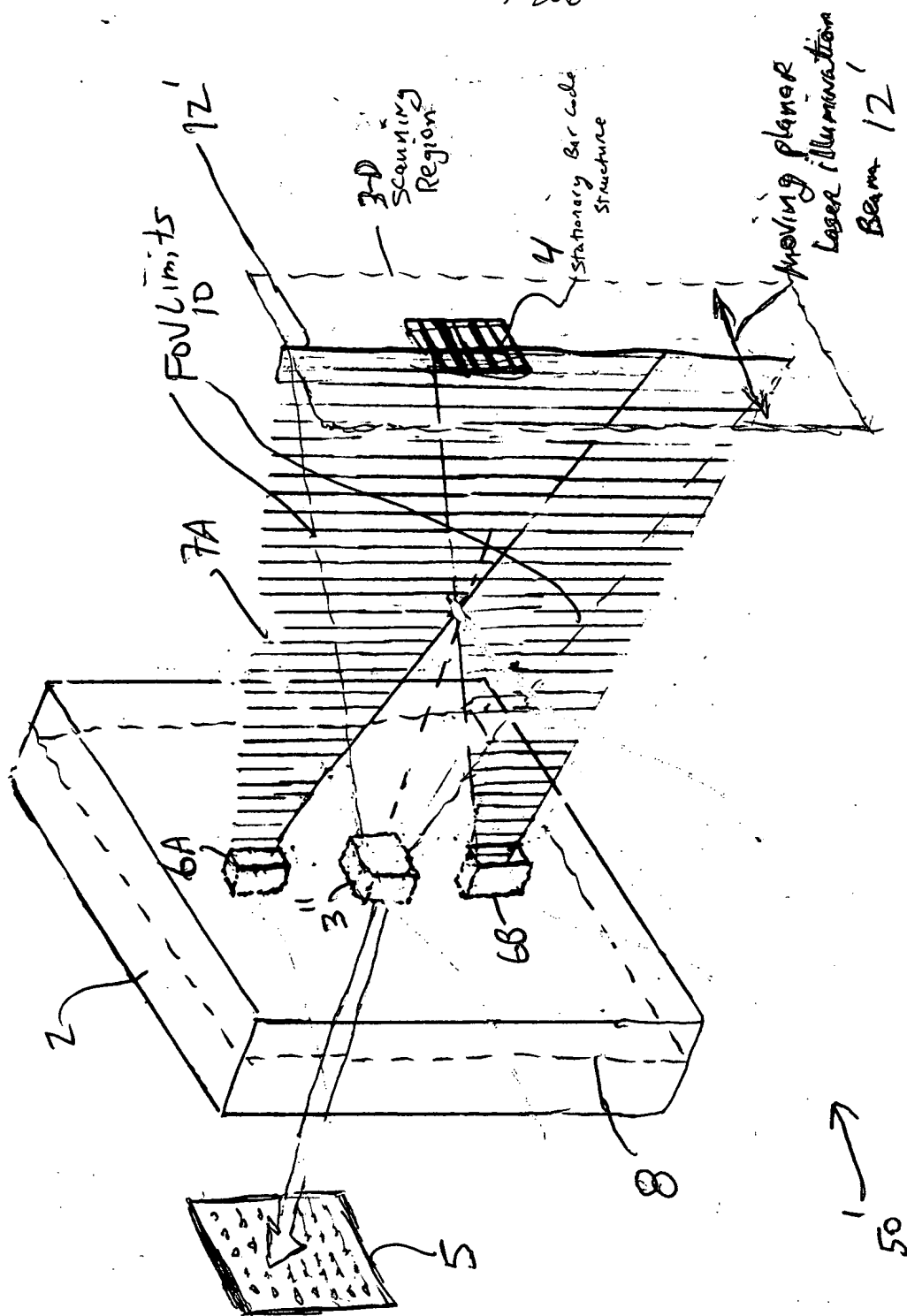


FIG. 3J1

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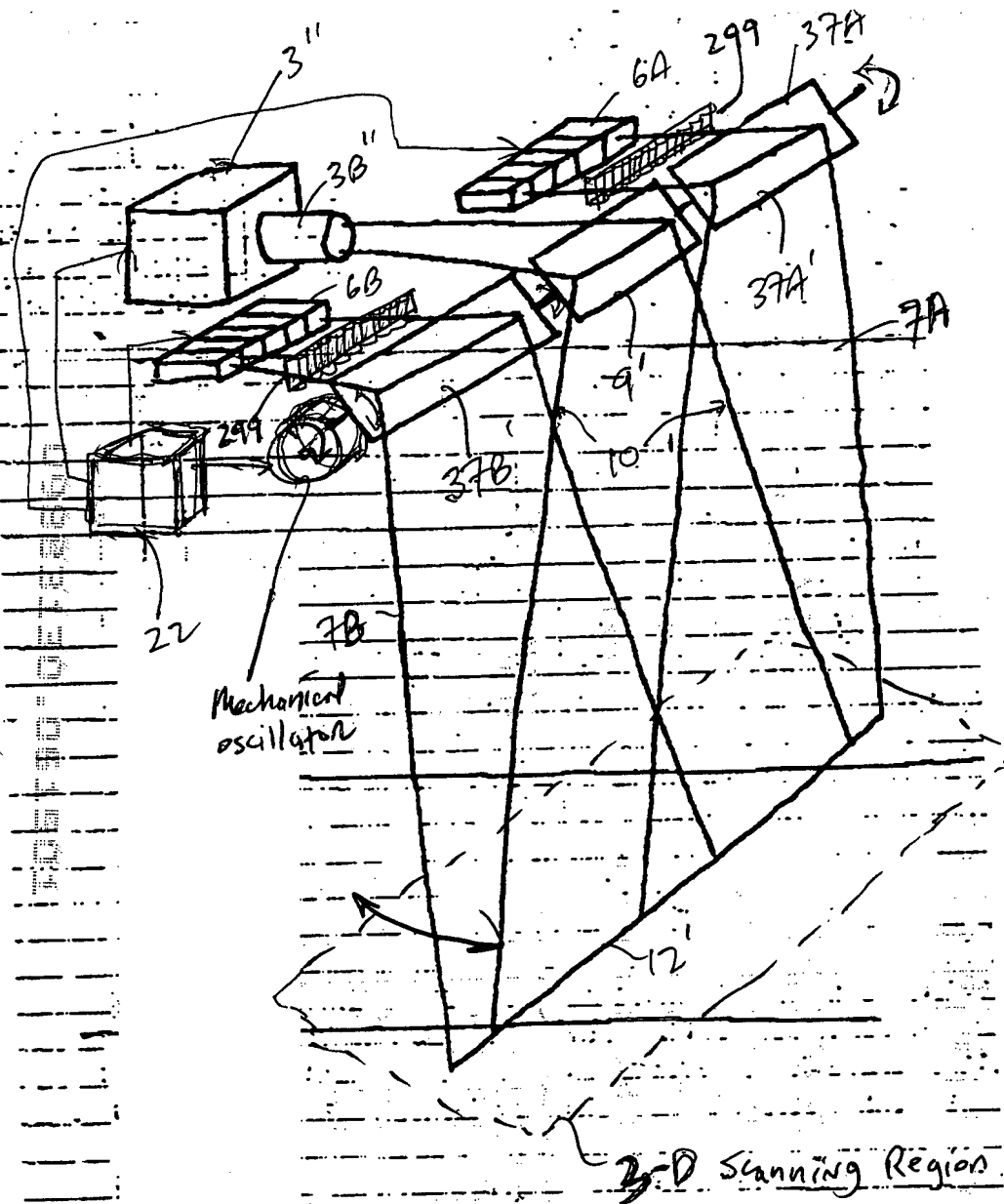
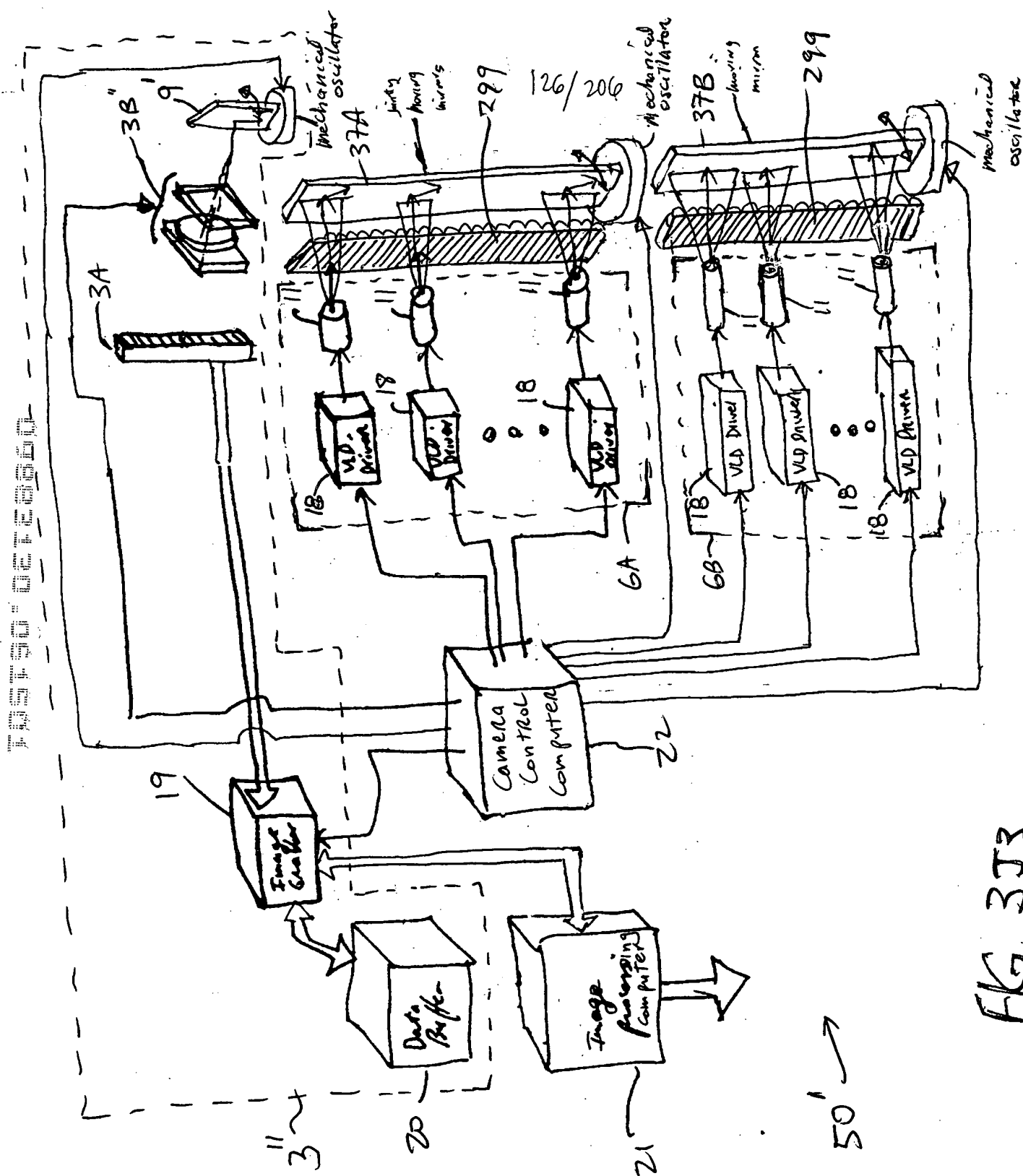


FIG 3J2

[illegible]

333

FIG. 354

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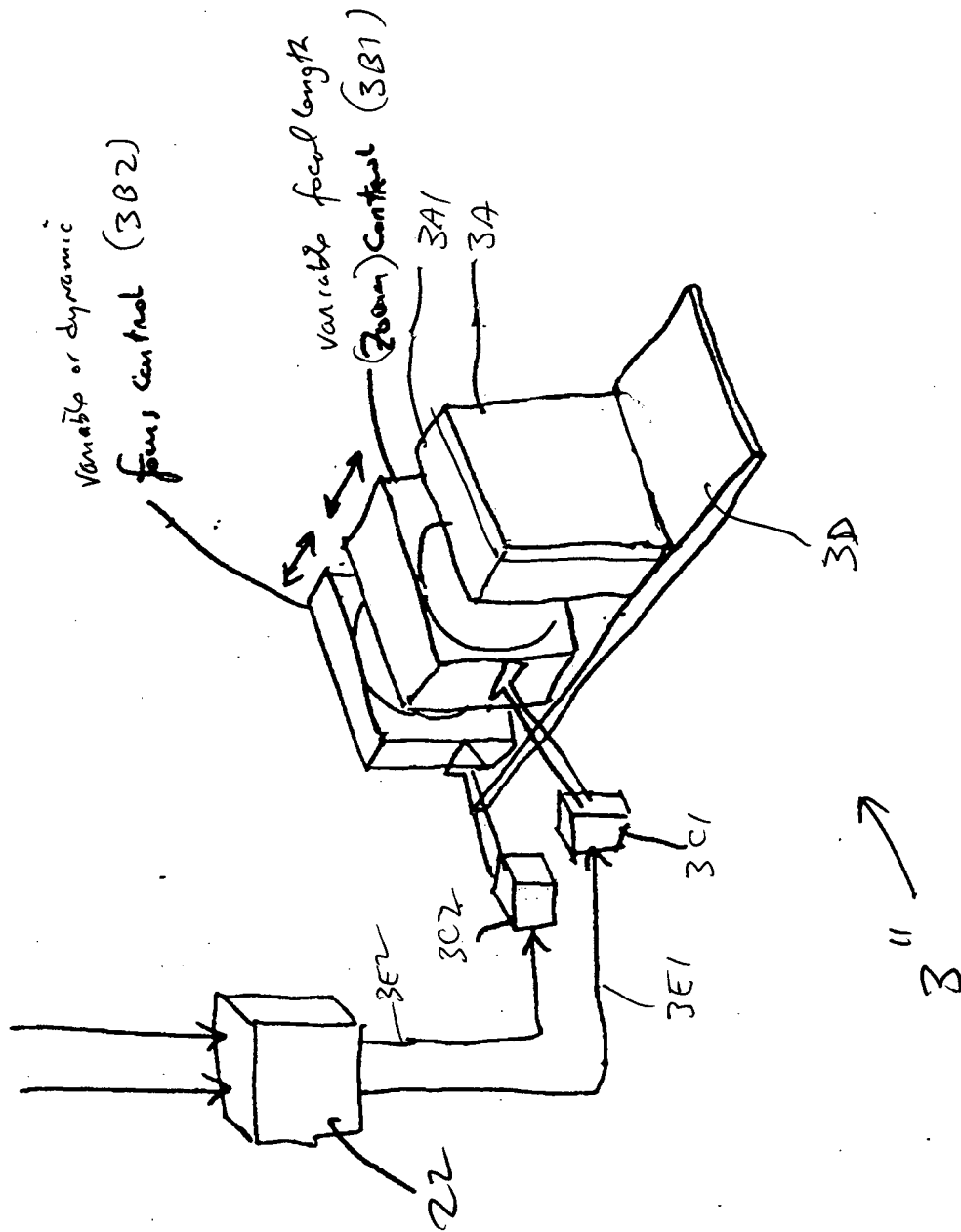


FIG. 354



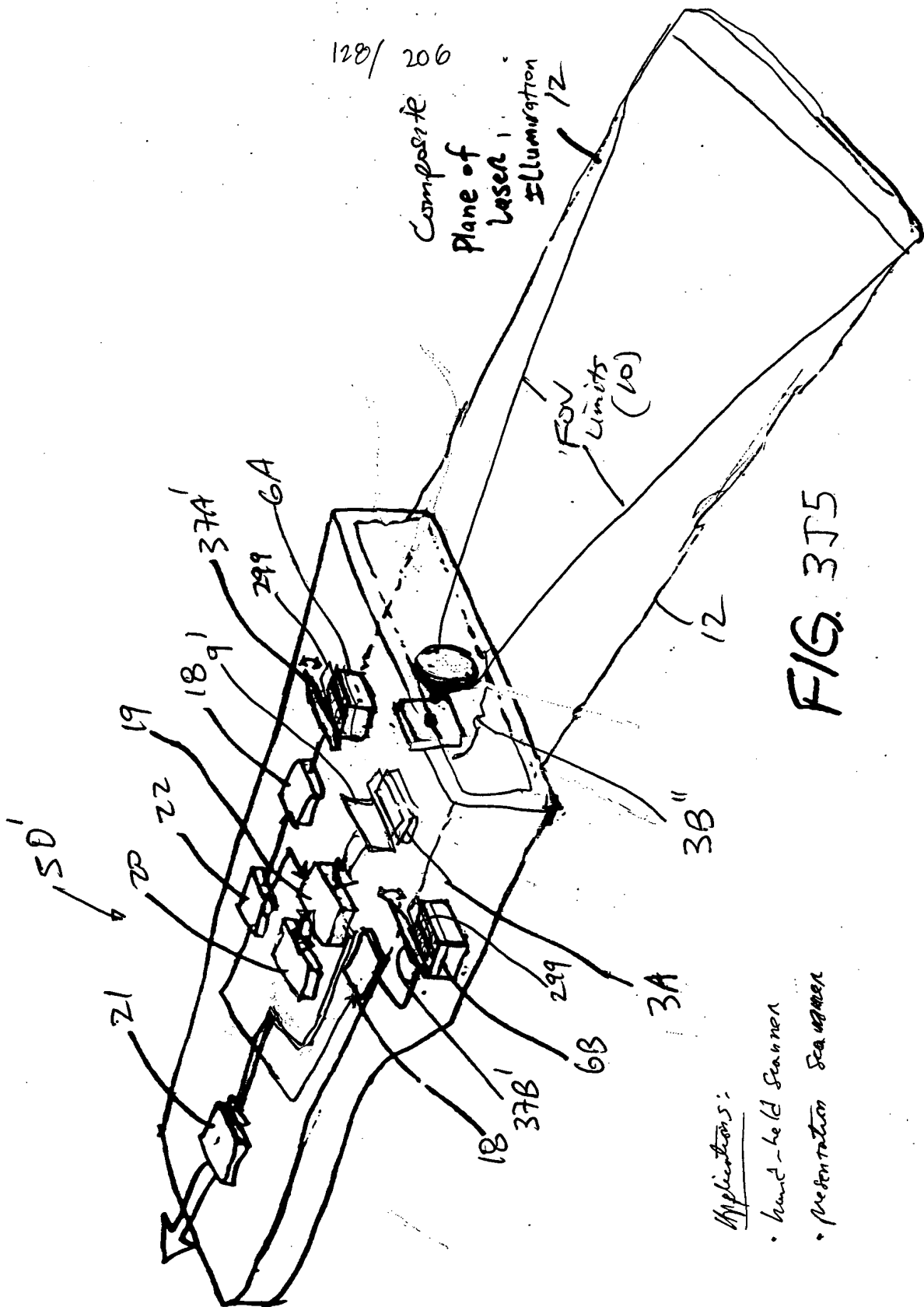
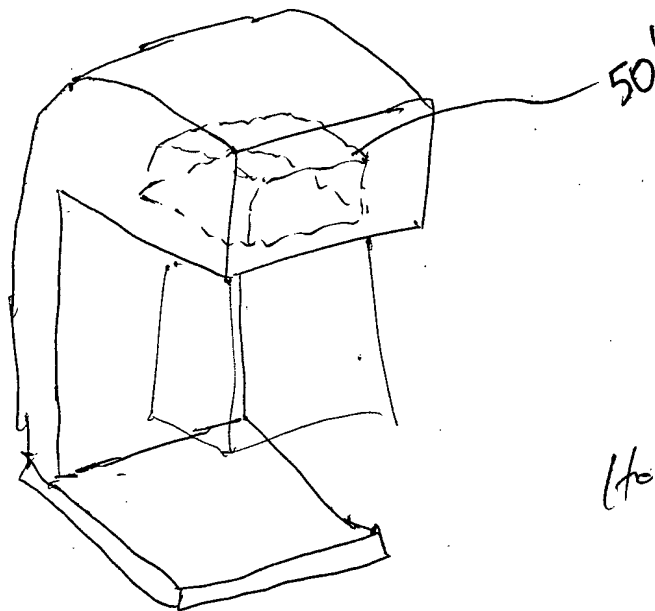


FIG. 3J5

Applications:

- hand-held scanner
- presentation scanner

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2-D  
hold-under  
scanner

FIG-316

2025-02-26

# REPORT OF THE COMMISSION OF THE EUROPEAN COMMUNITIES ON THE ACTIVITIES OF THE COMMISSION OF THE EUROPEAN COMMUNITIES IN THE FIELD OF ENVIRONMENTAL POLICY 1980-1981

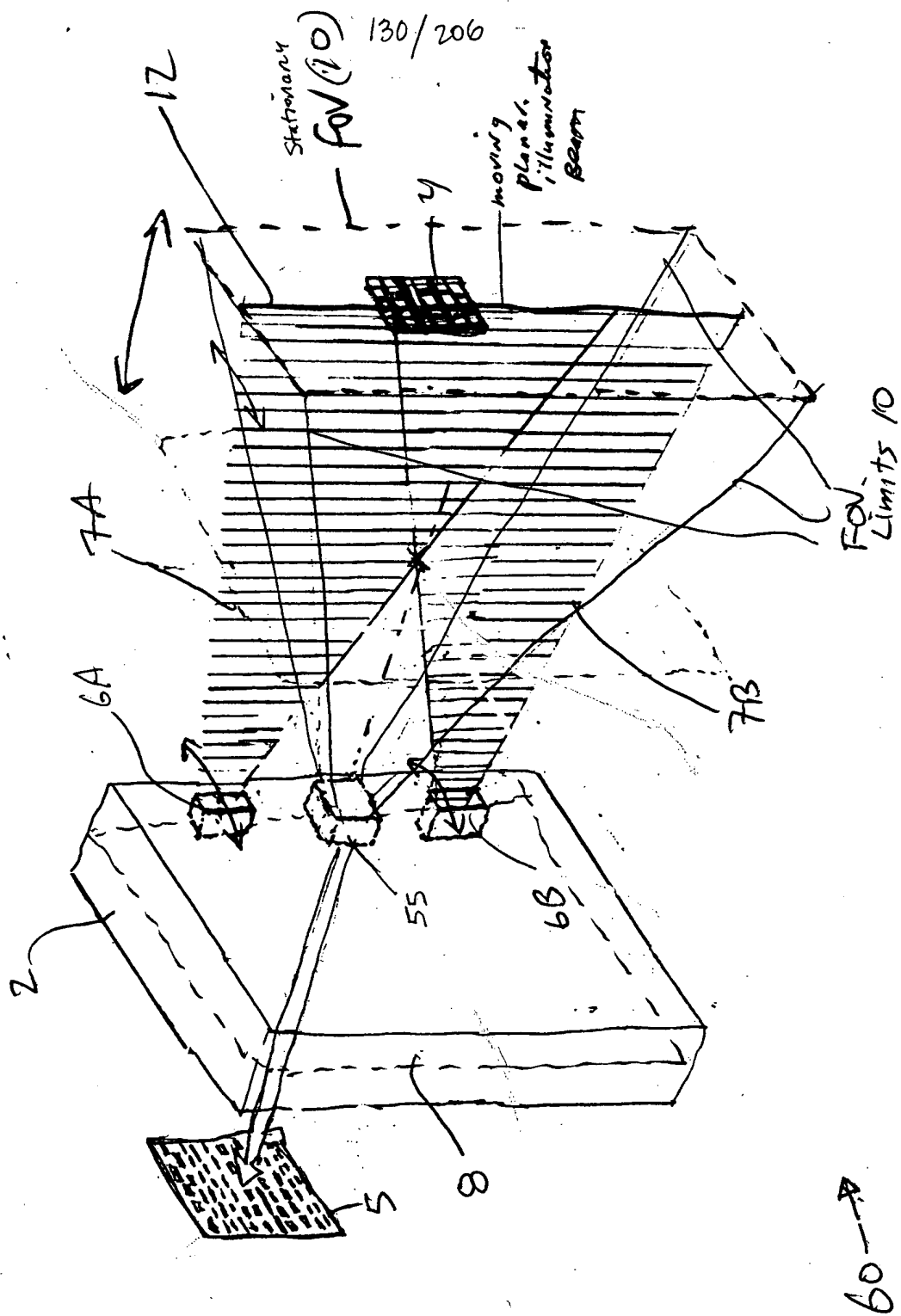
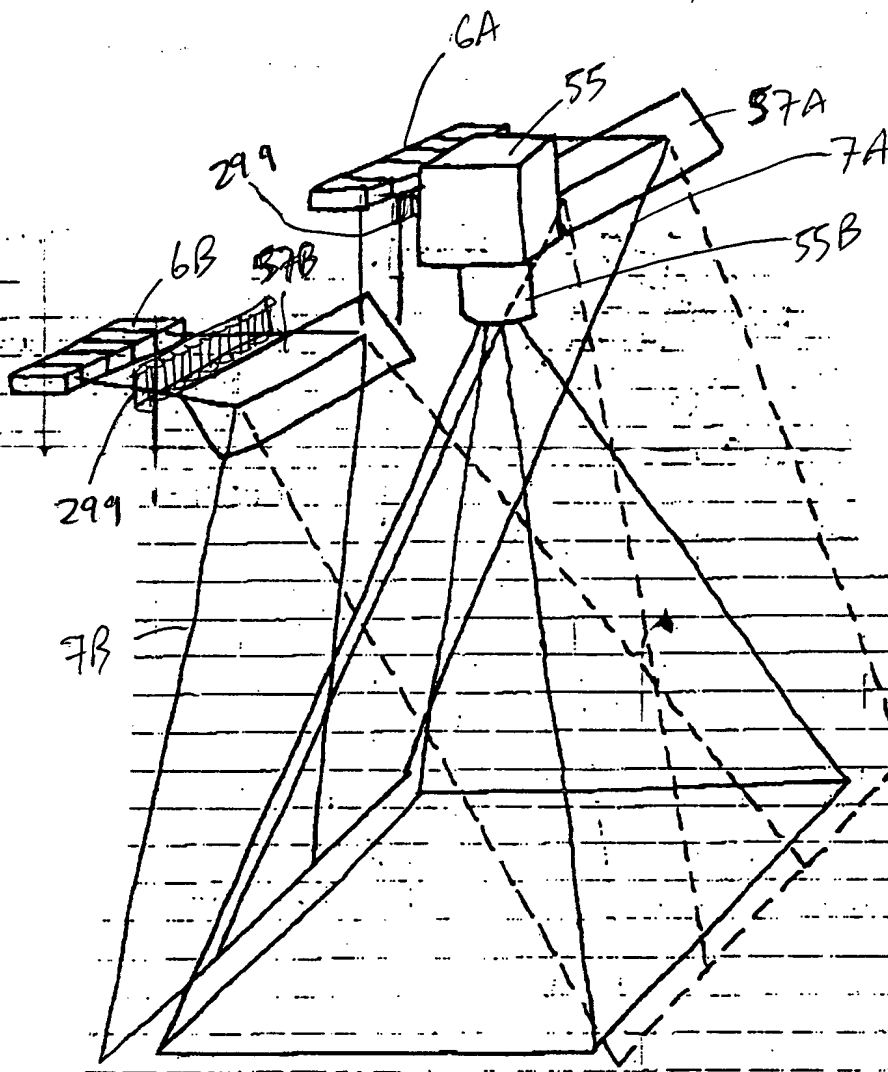


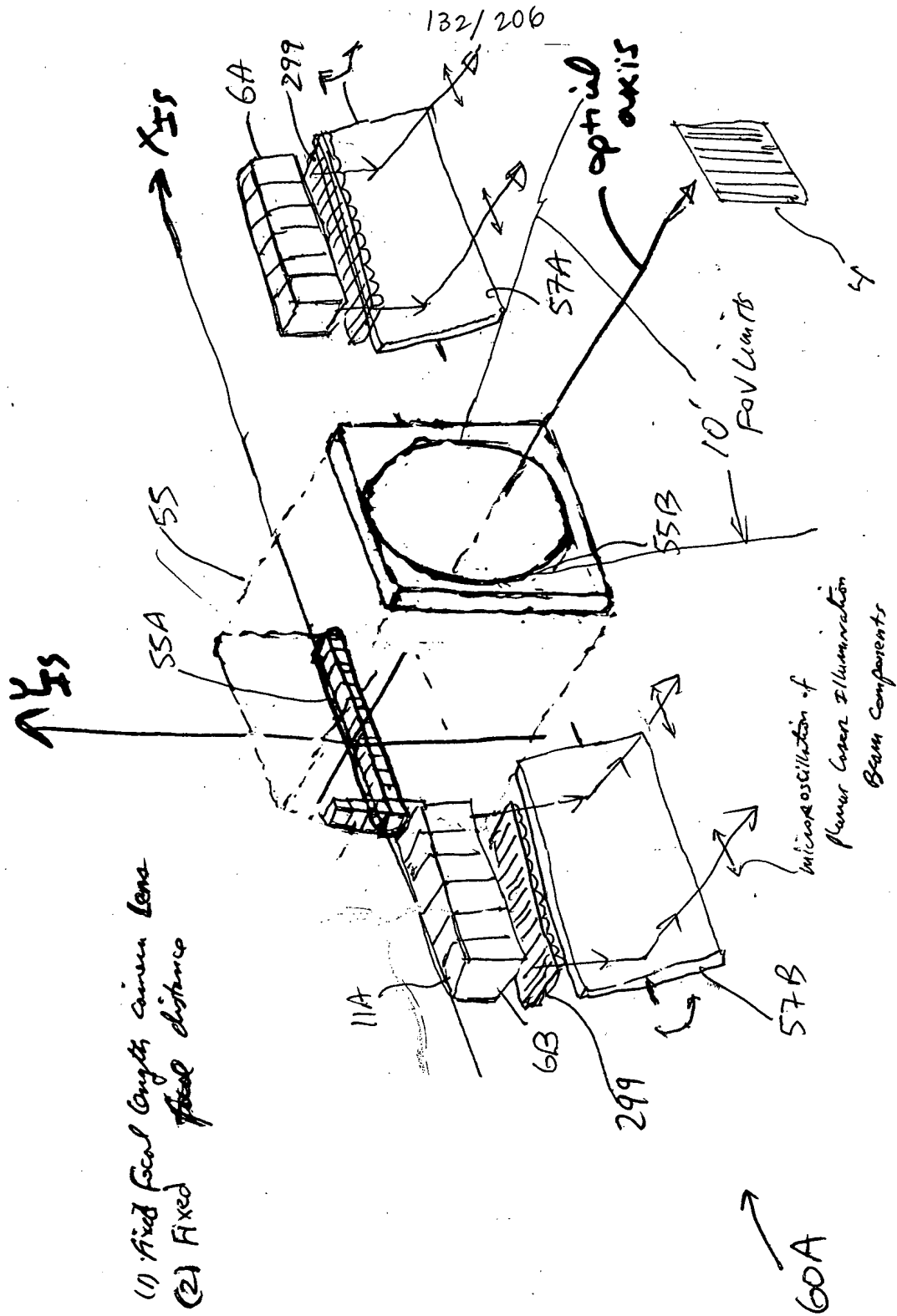
FIG 4A

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60A

FIG. 4B1



- (1) Fixed focal length convex lens
- (2) Fixed focal distance

FIG. 4BZ

FIG. 4B3

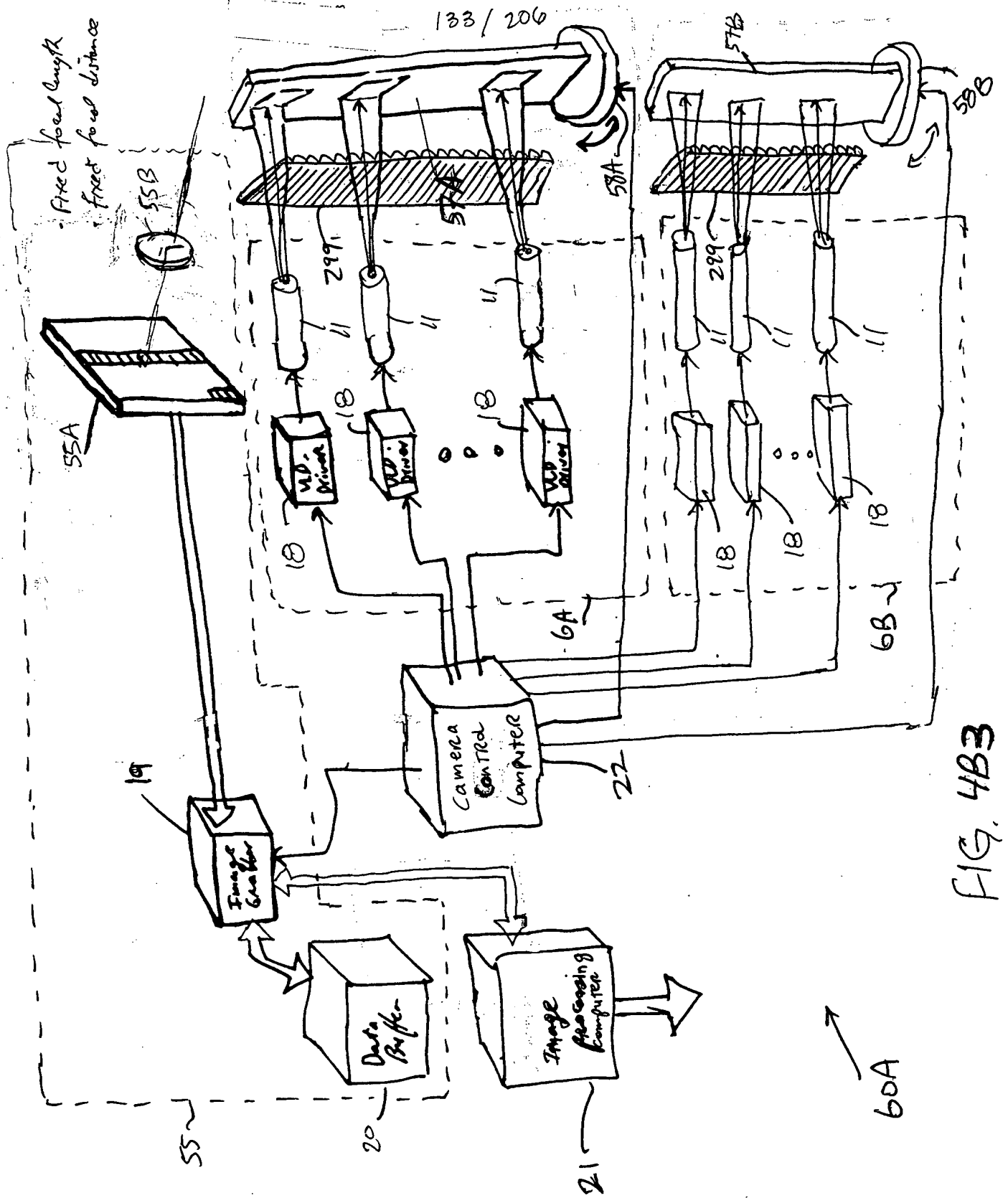


FIG. 4B3

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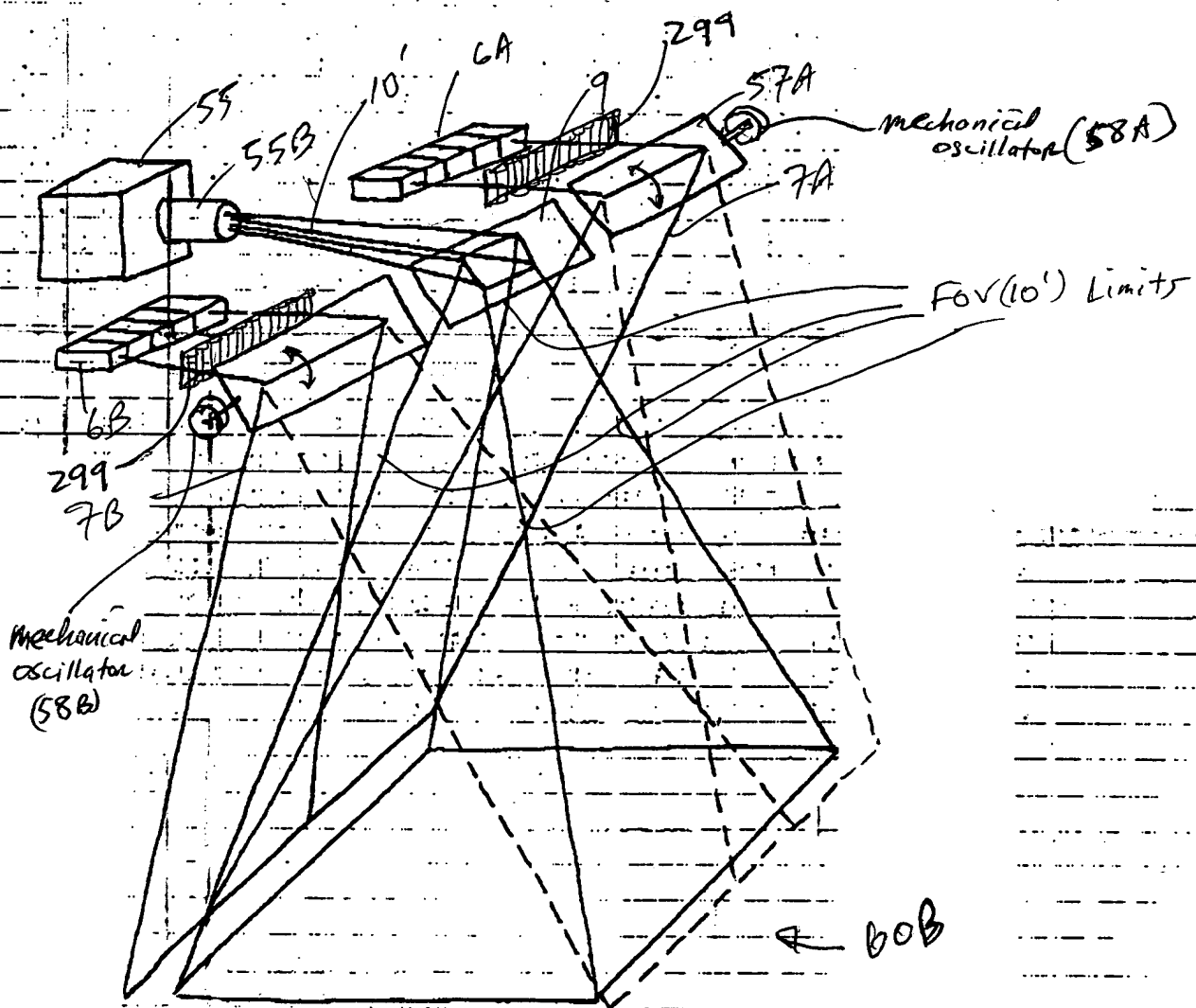


FIG. 4C1

POSTED OCT 2000

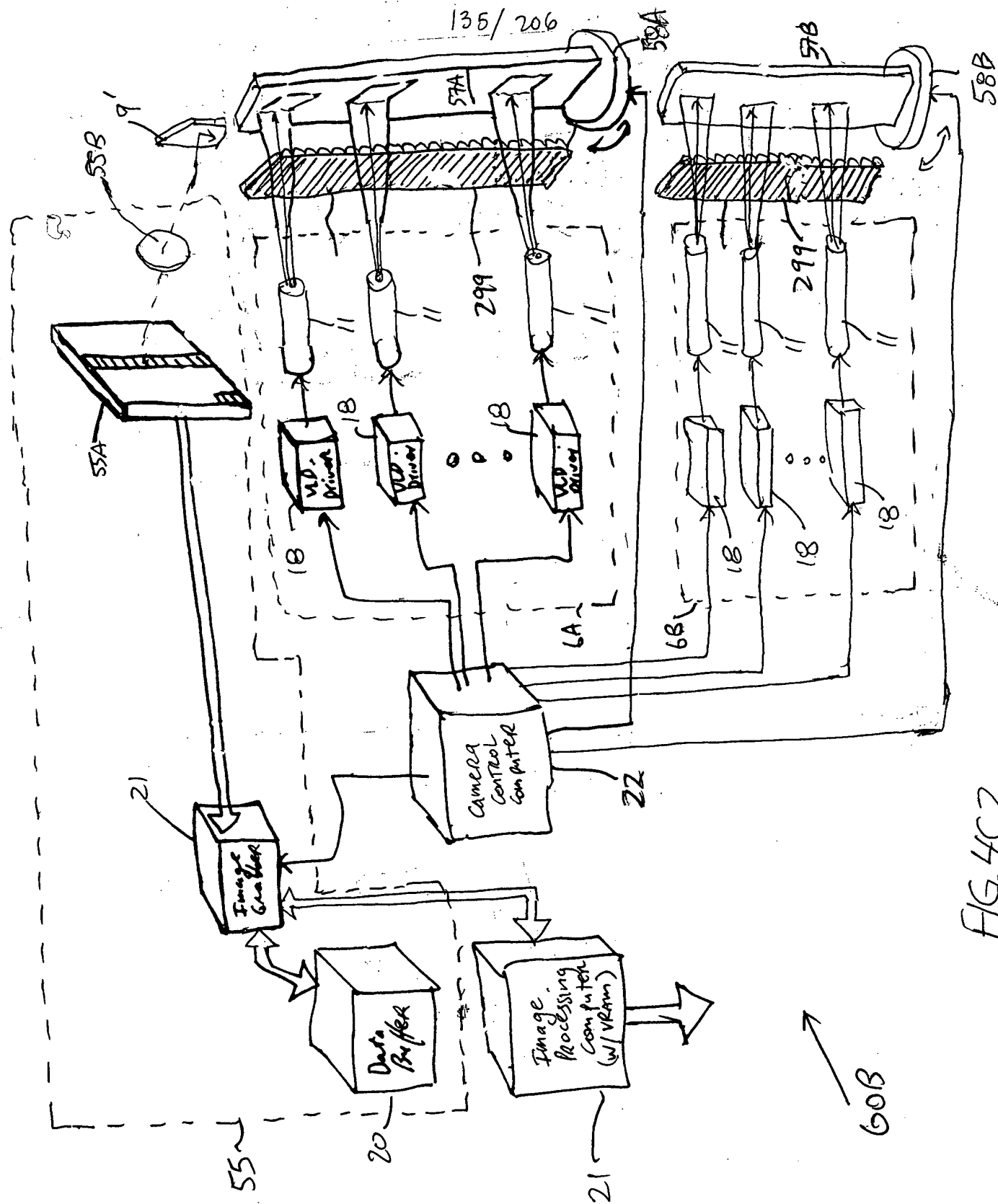


FIG. 4C2



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POSTED: OCT 2006

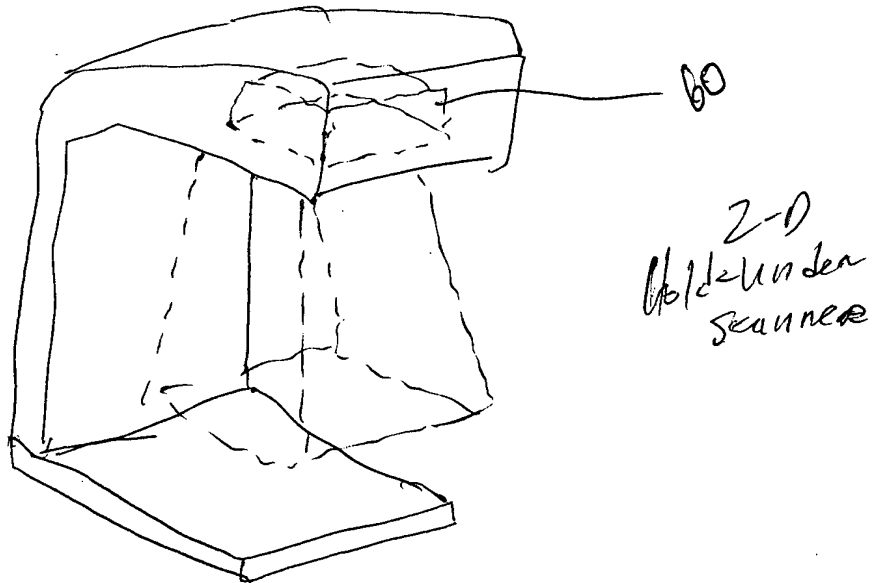


FIG. 4D

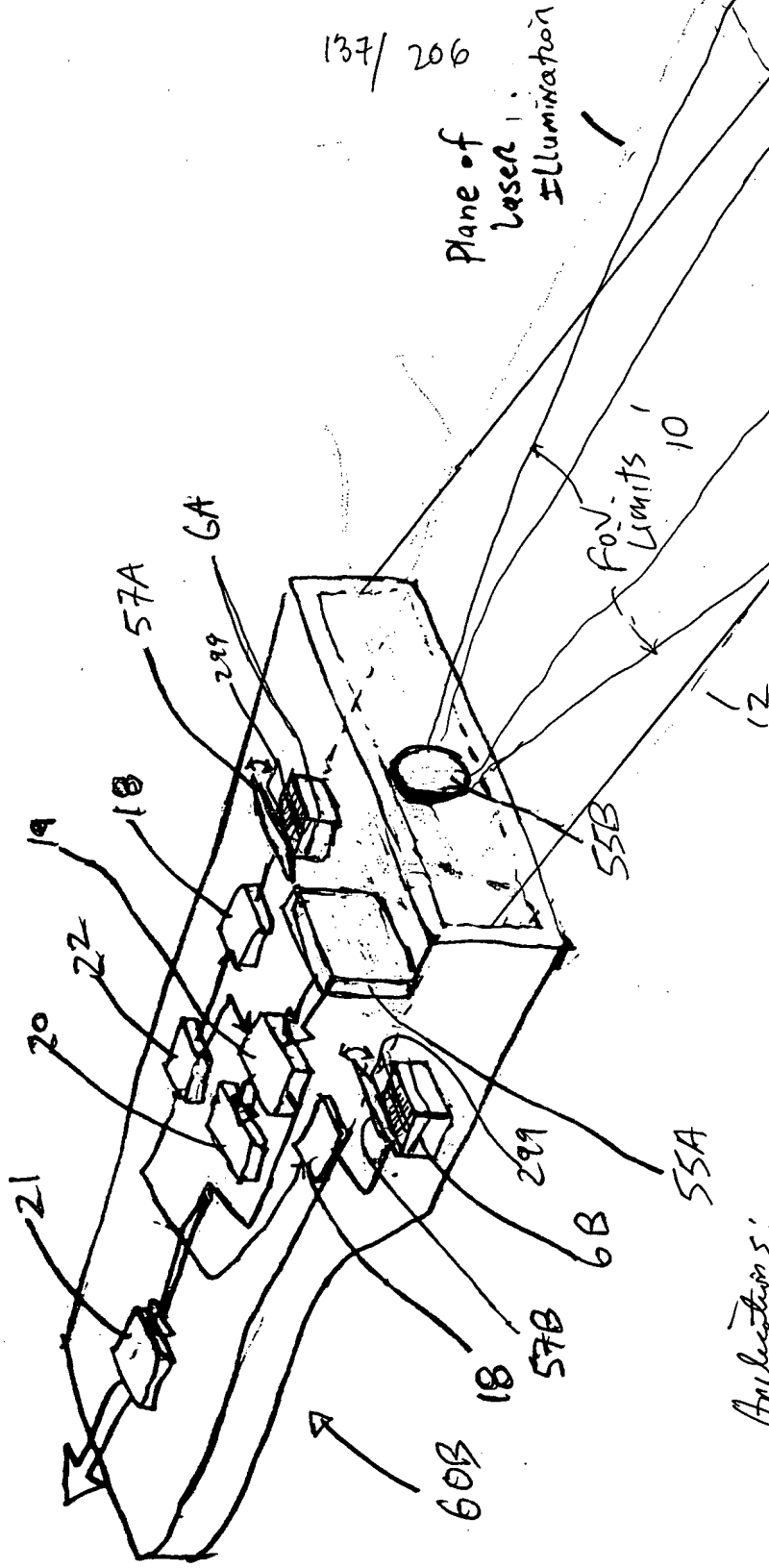


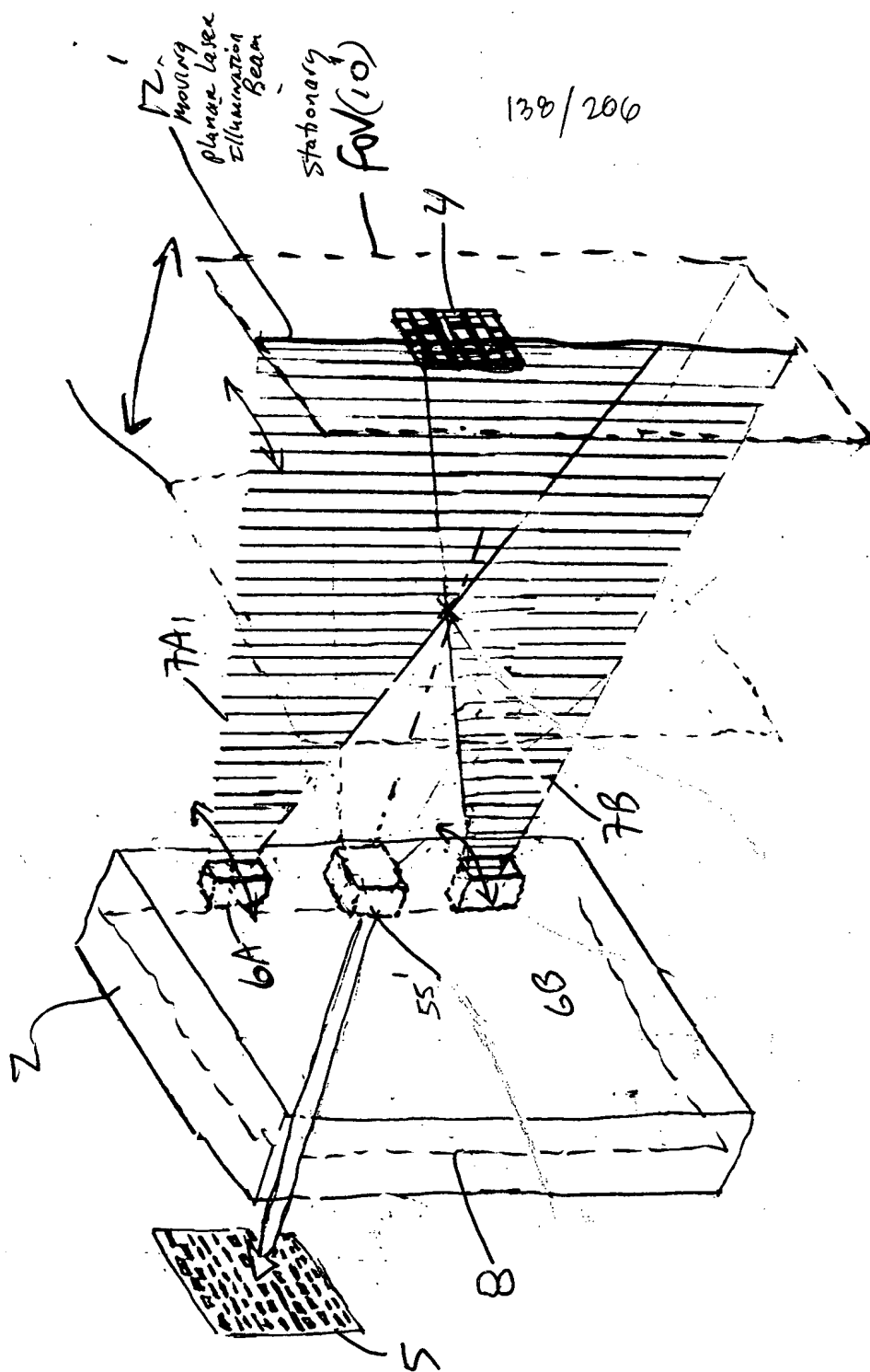
FIG. 4E

Applications:

- Hand-held Scanner
- Presentation Scanner

[illegible]

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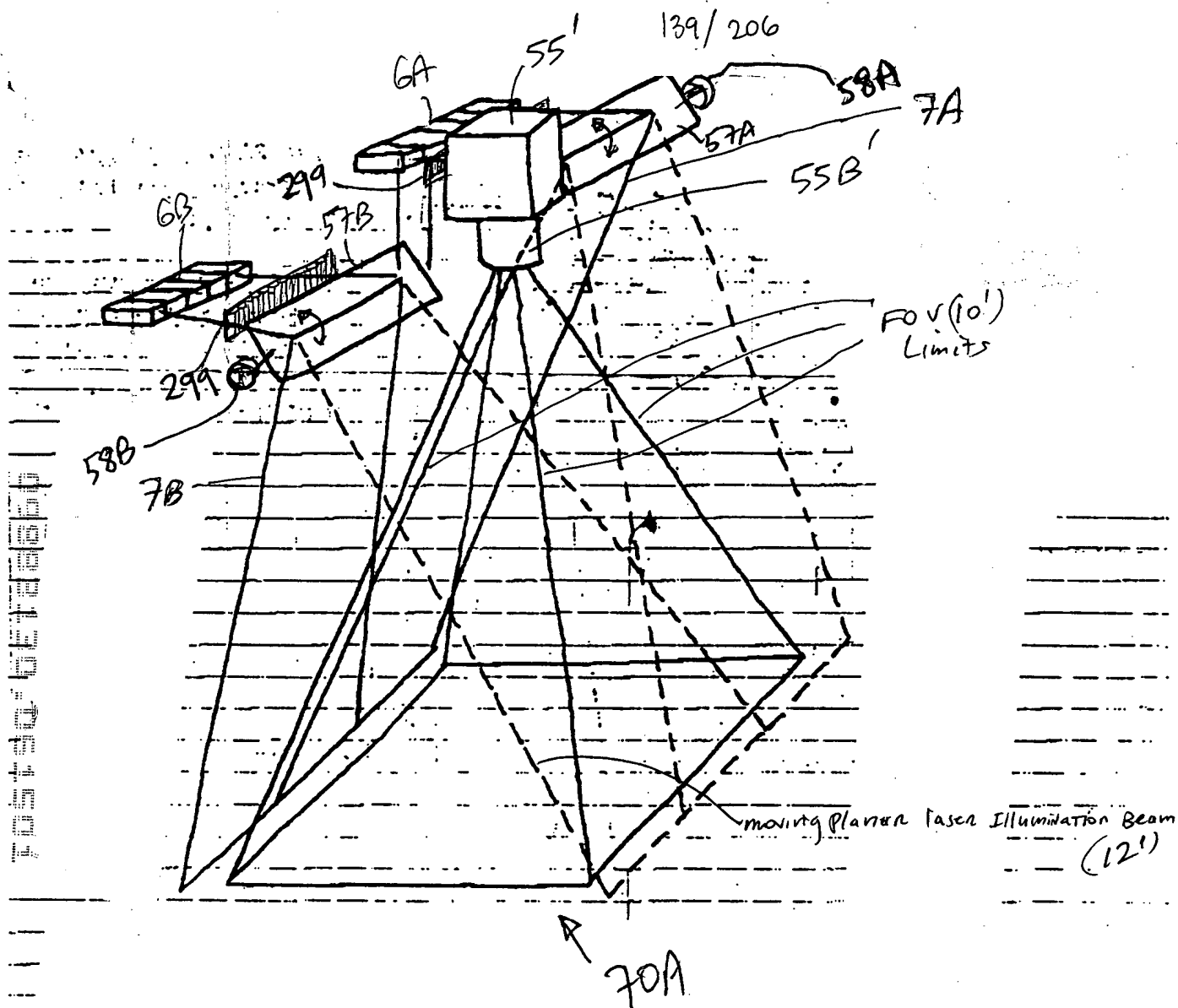
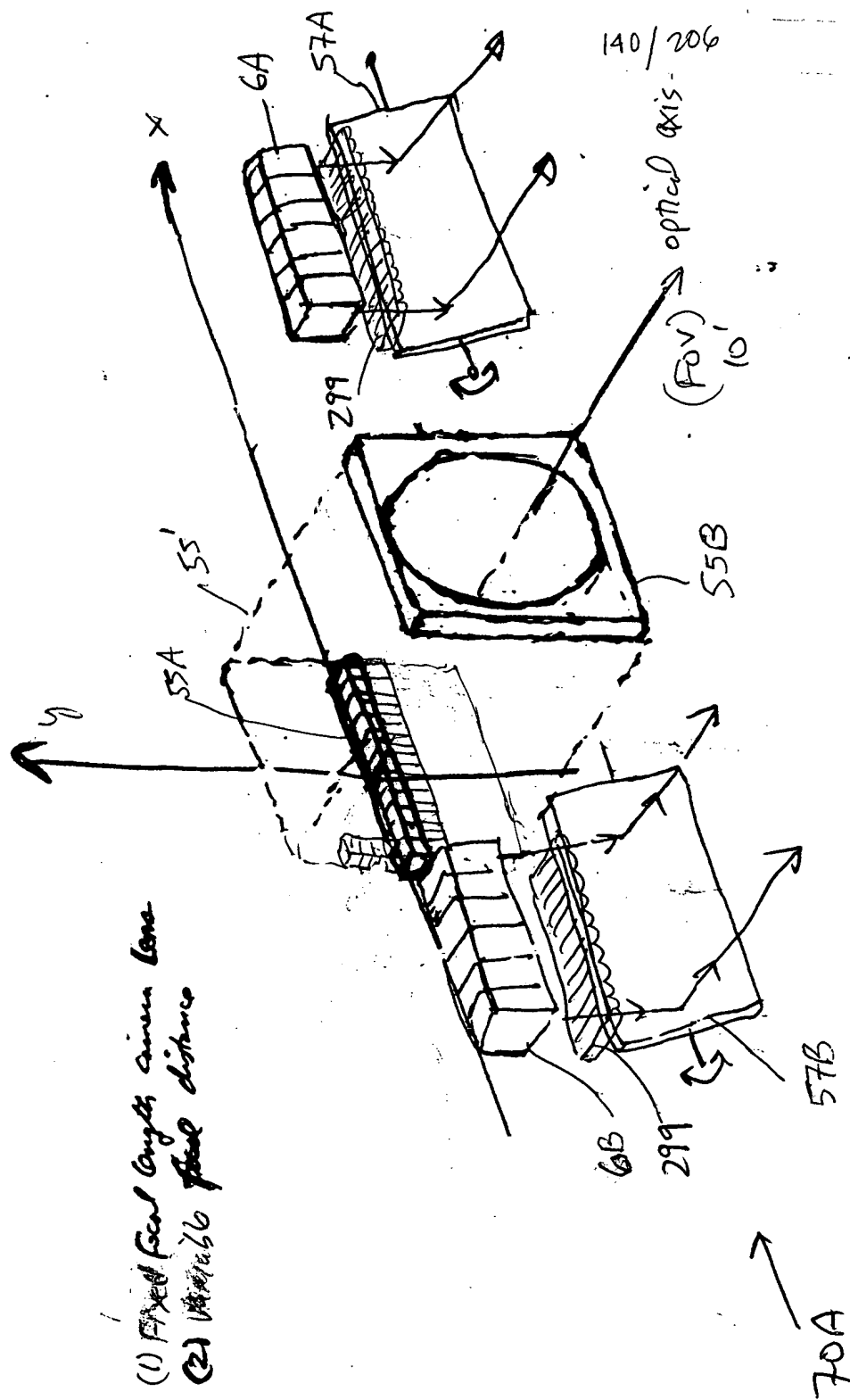


FIG 5B1



- (1) Fixed focal length camera lens
- (2) Variable fluid distance

FIG. 5B2

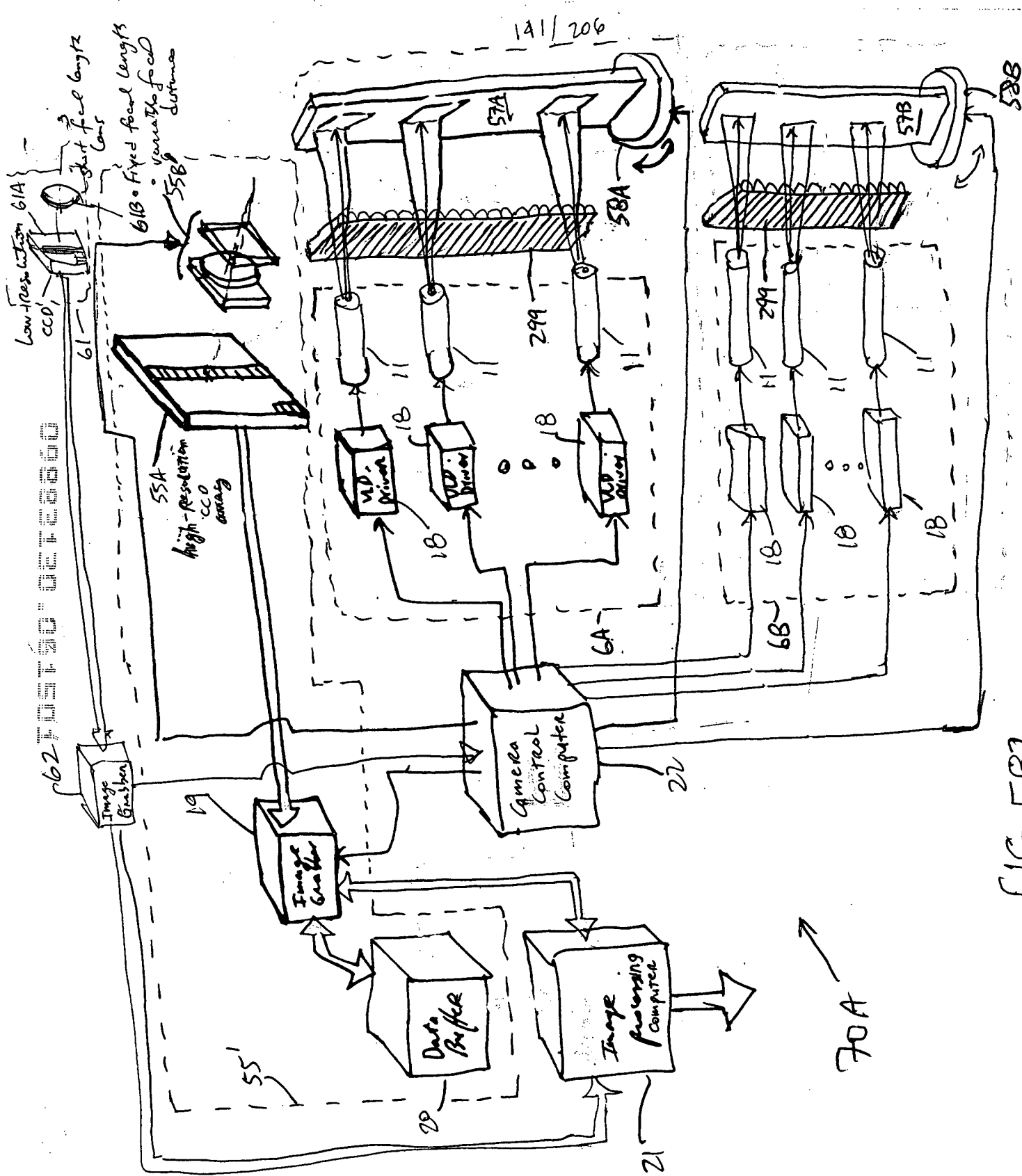


FIG. 5B3

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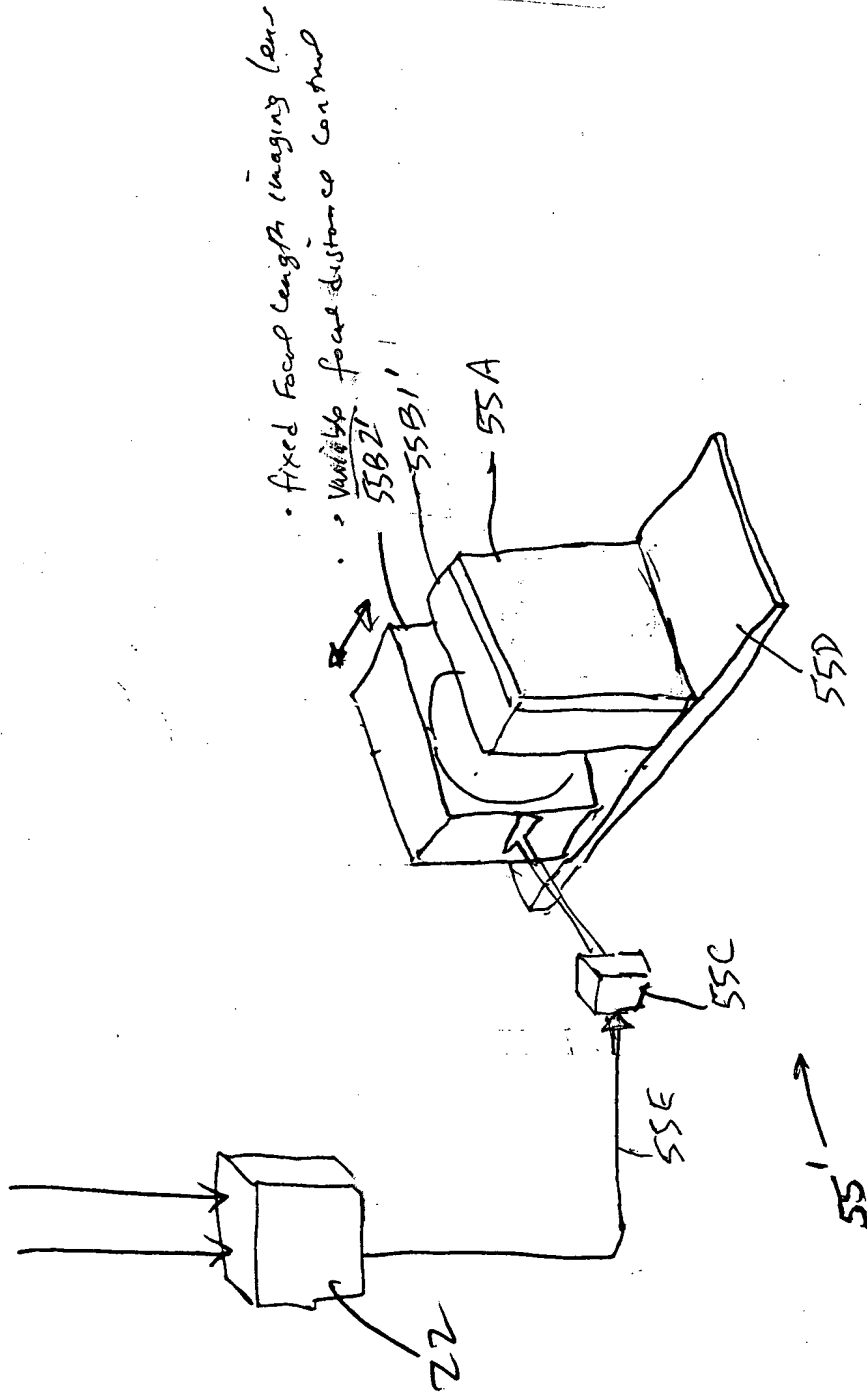


FIG. 5B4

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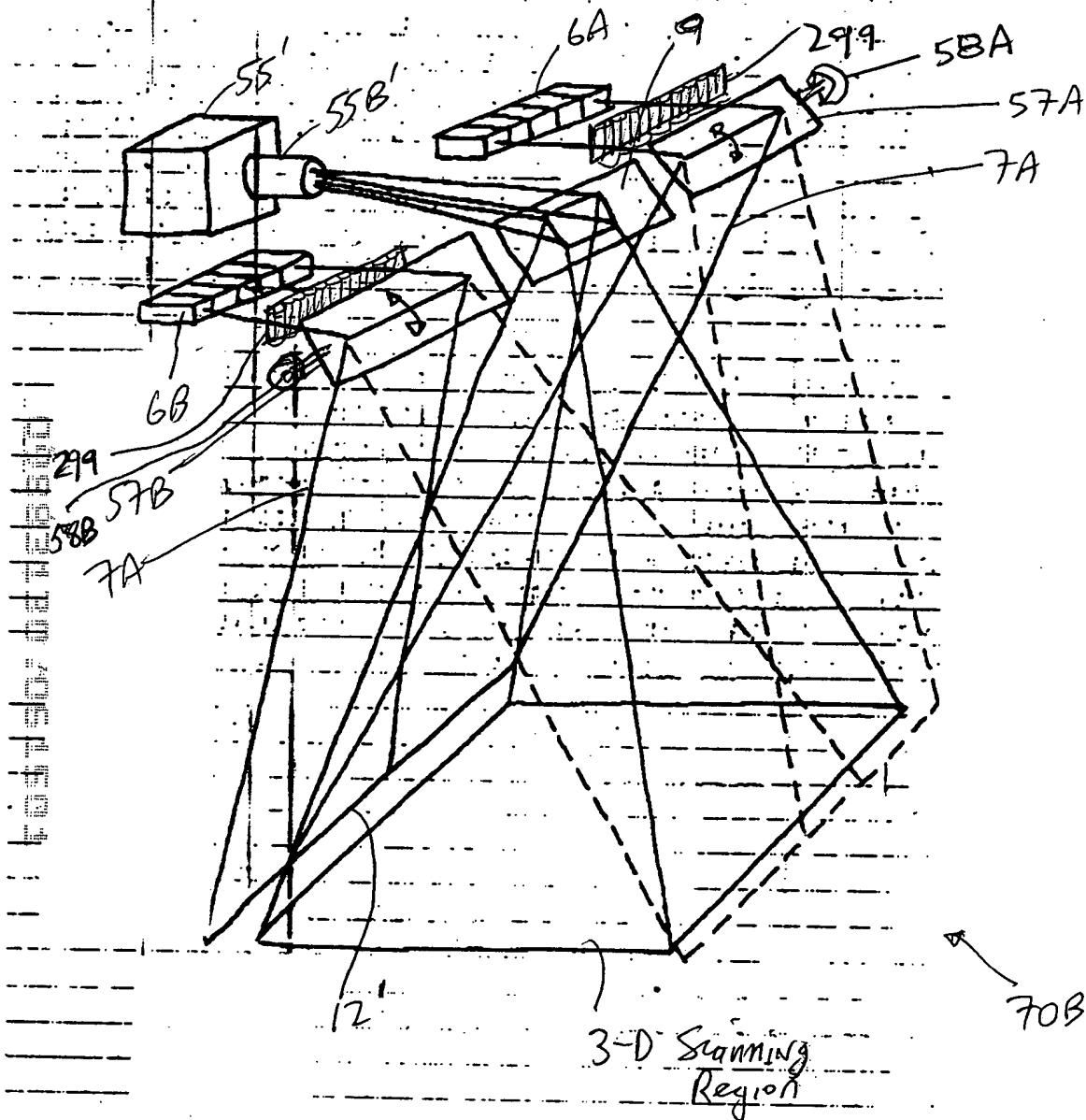
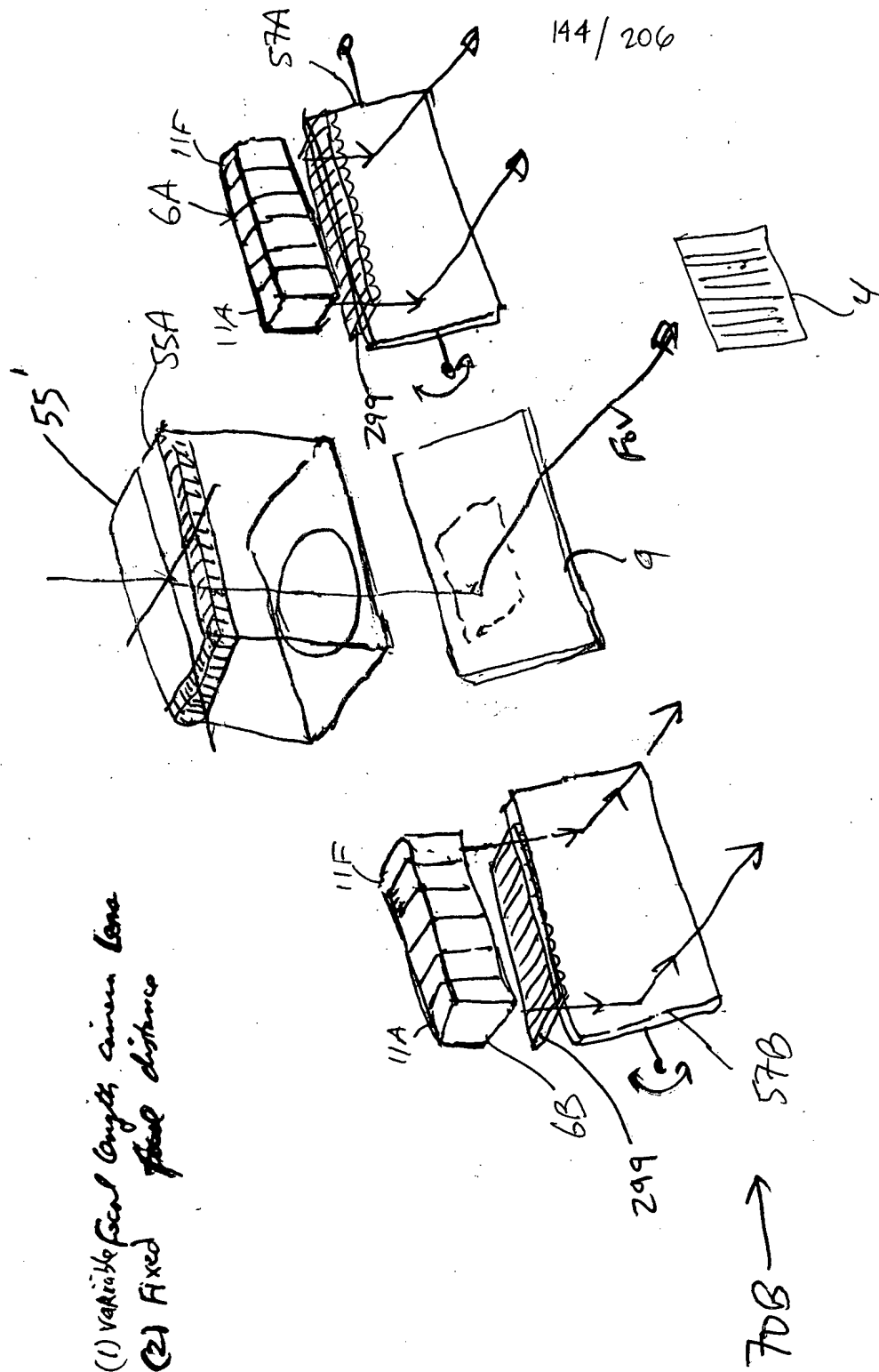


FIG. 5C1



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- (1) Variable focal length camera lens
- (2) Fixed focal distance

FIG. 502

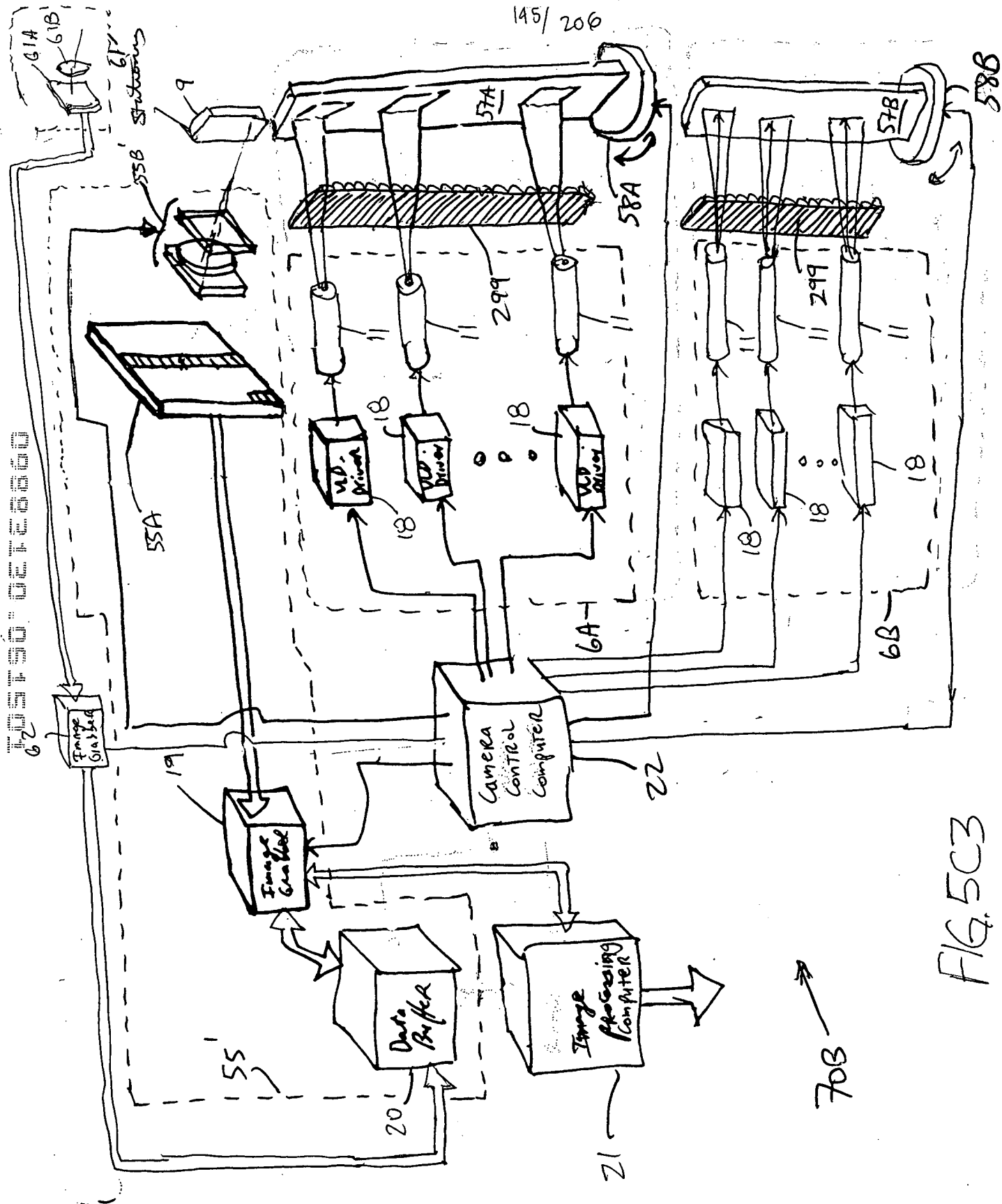


FIG. 5C3

70B

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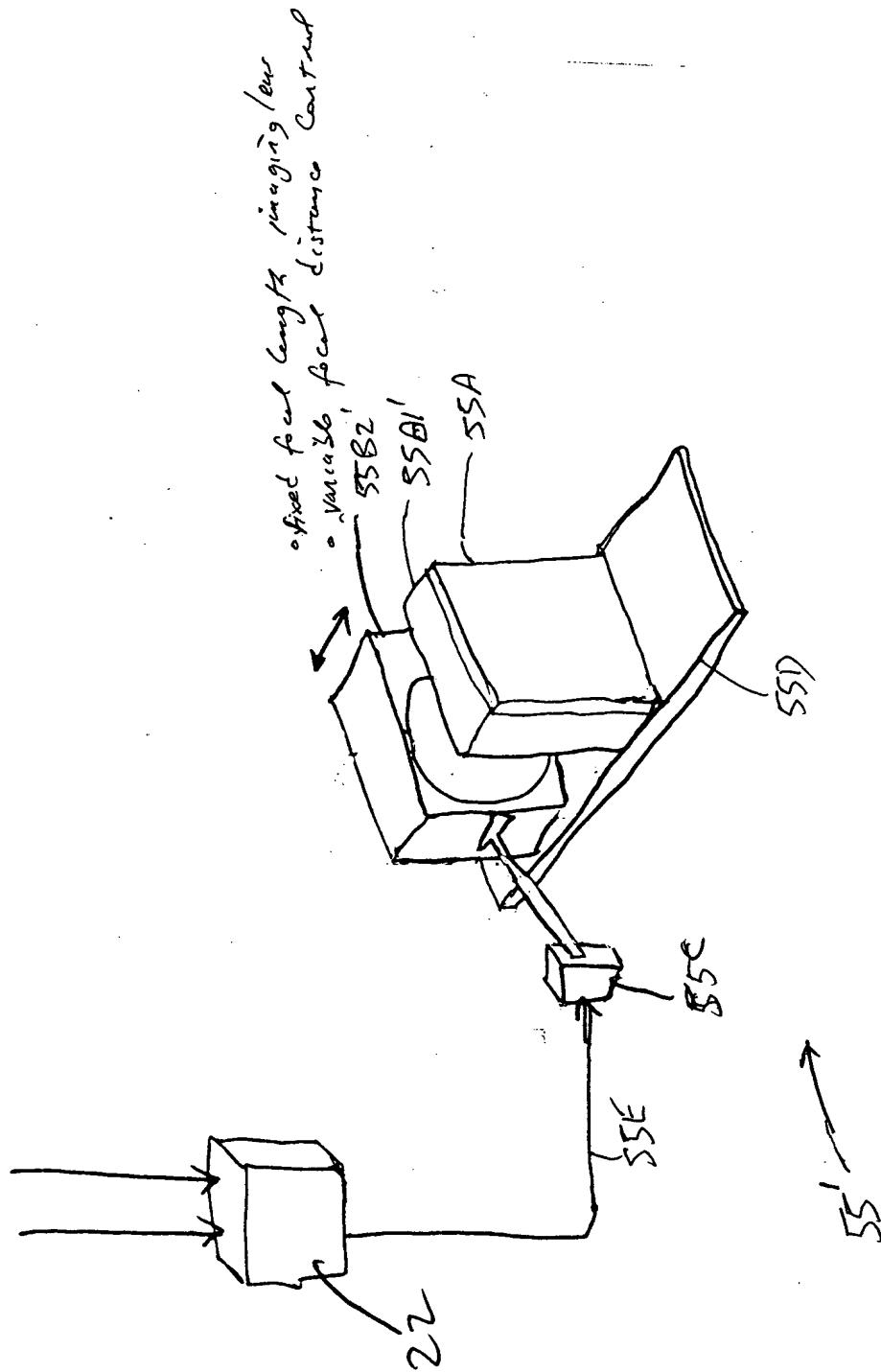
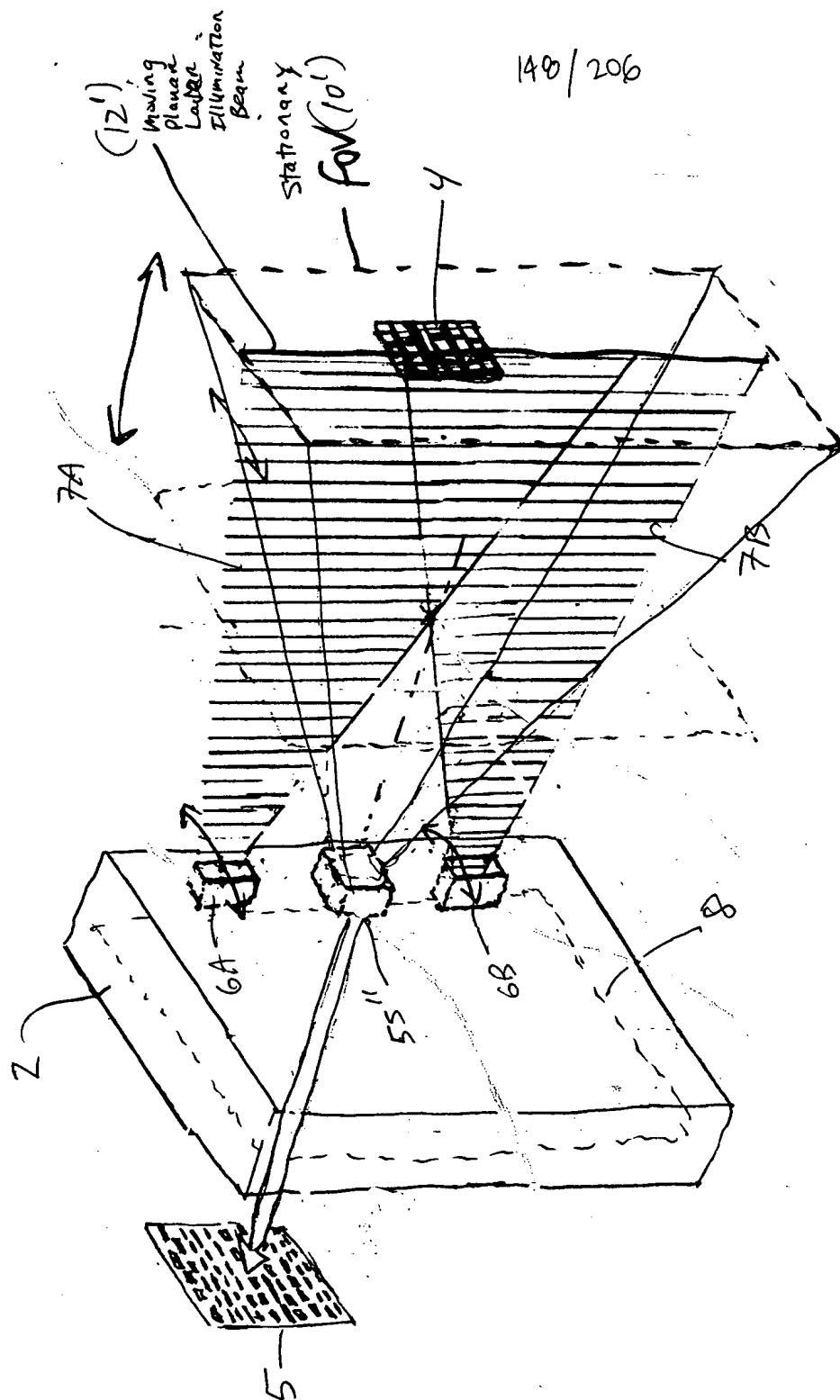


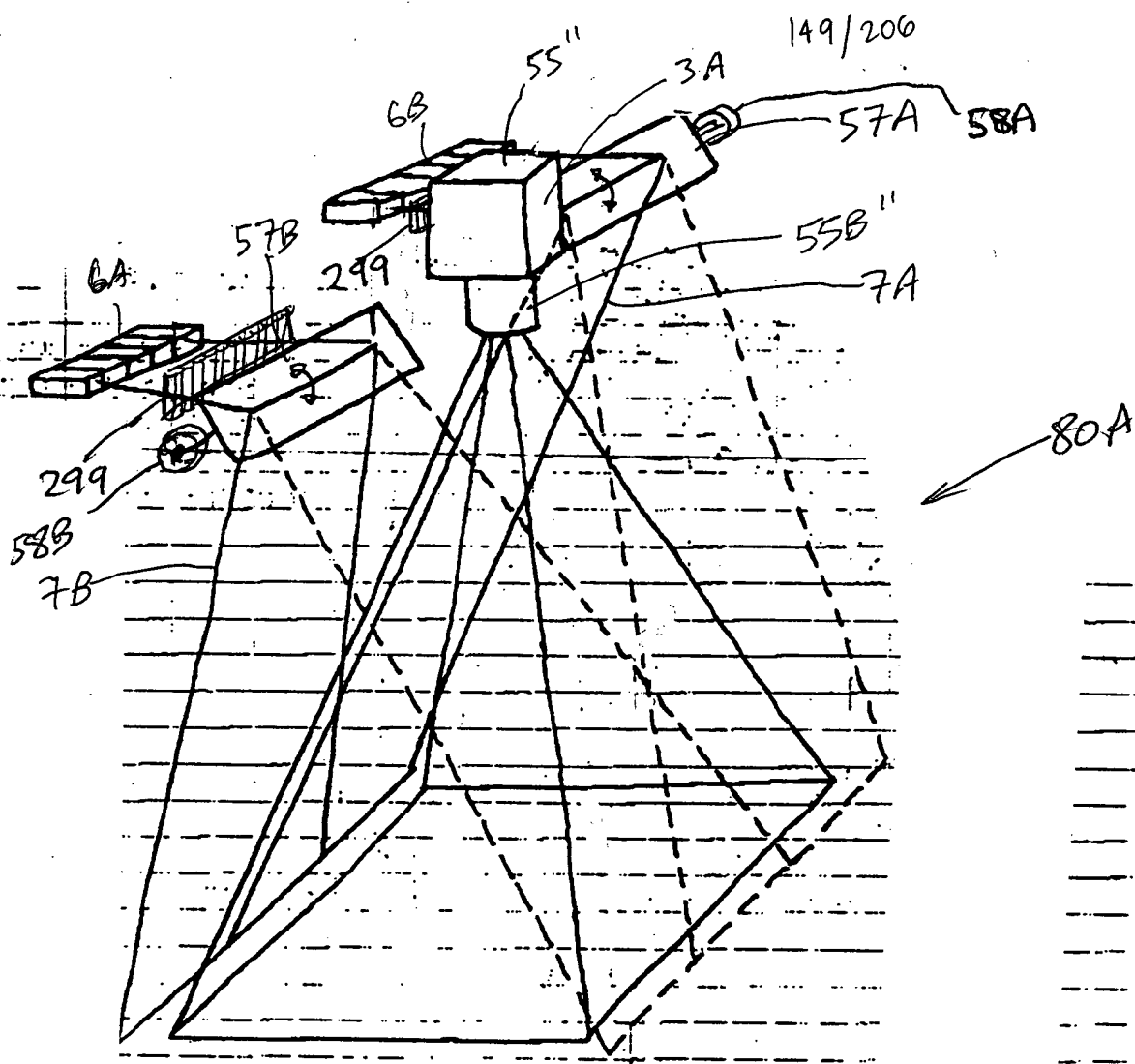
FIG. 5C4

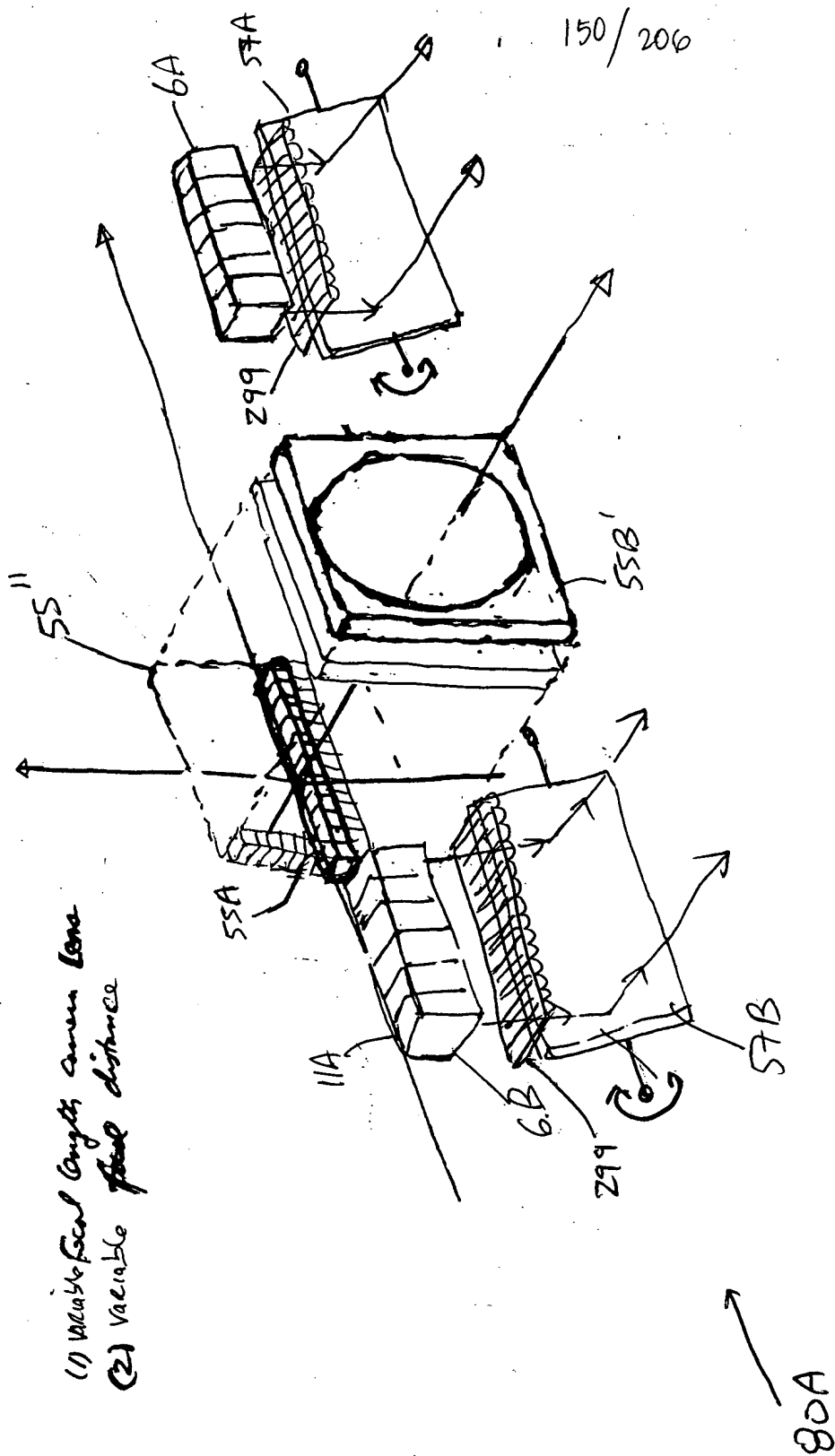


FIG. 5D



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(1) Variable length annular lens  
(2) Variable fluid distance

FIG. 6B2

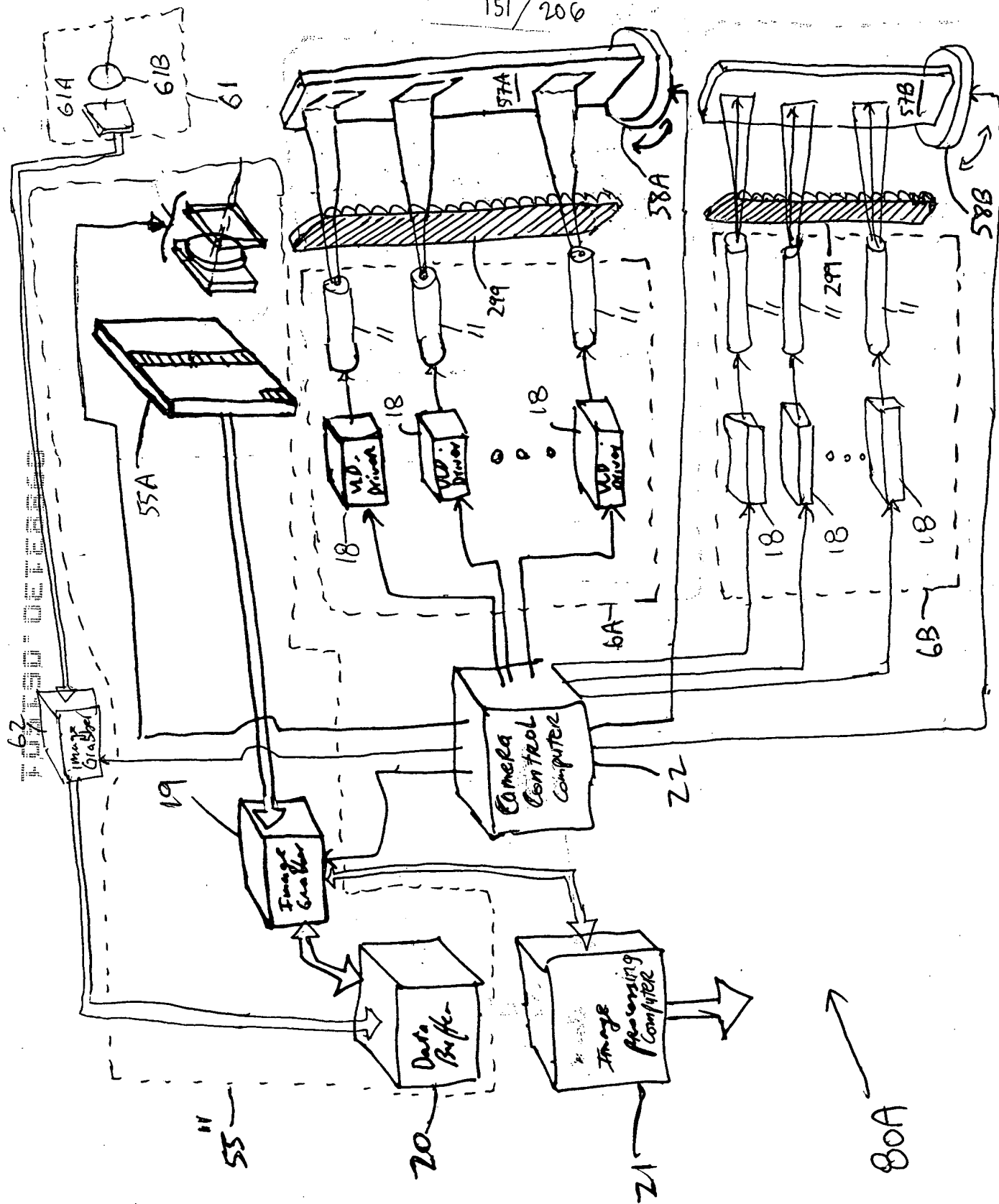


FIG. 6B3



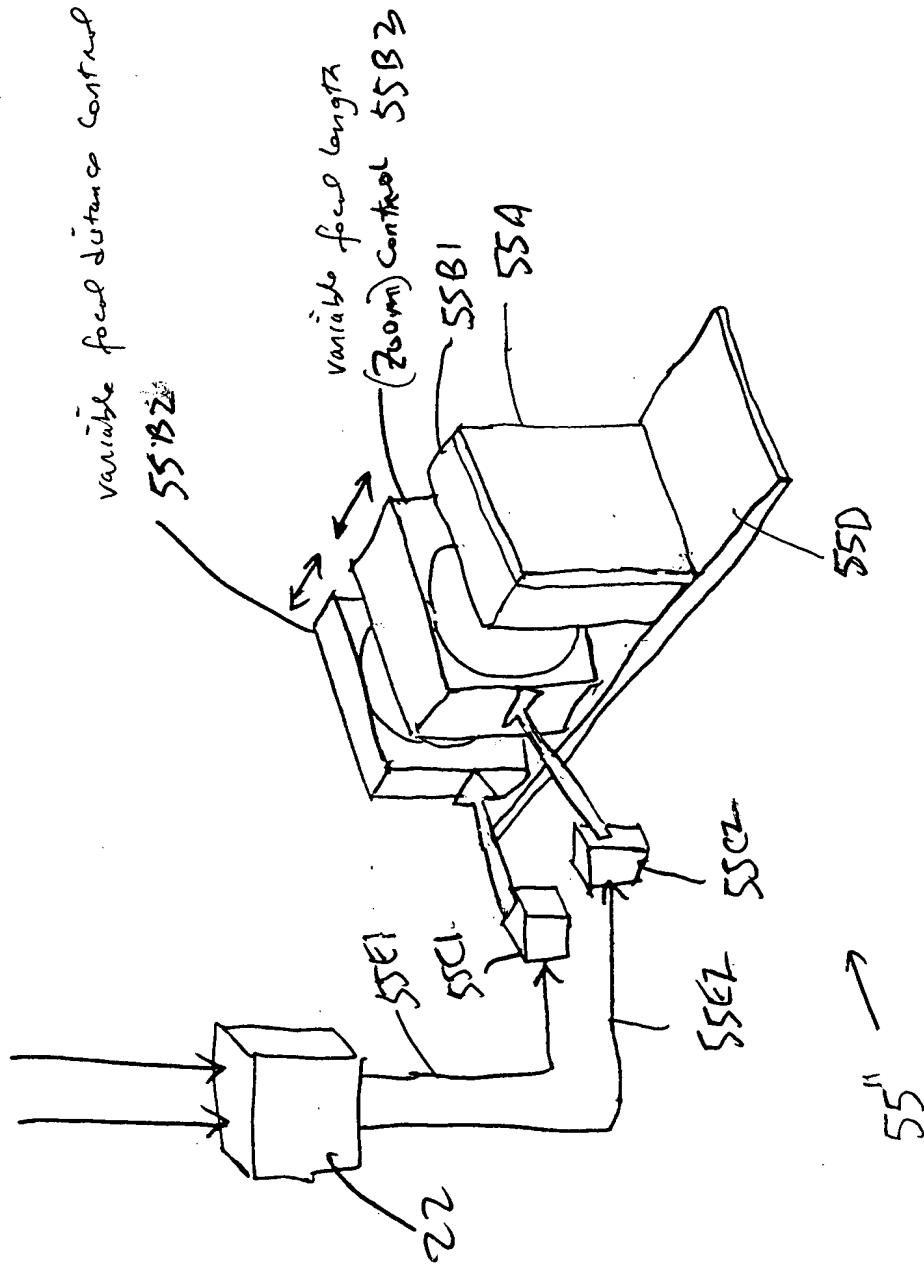


FIG. 6B4

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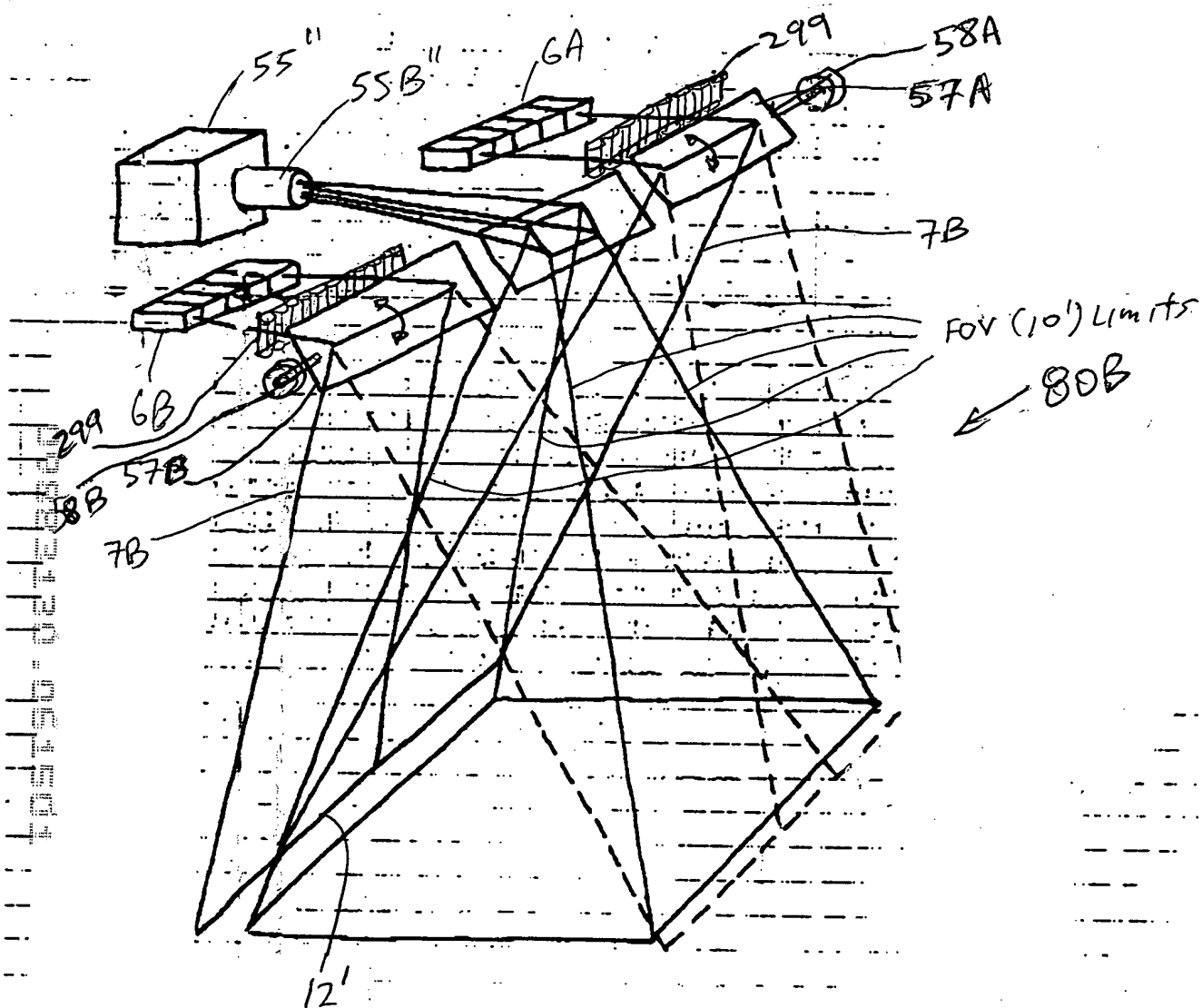


FIG. 6C1

- (1) Variable focal length camera lens
- (2) Variable focal distance

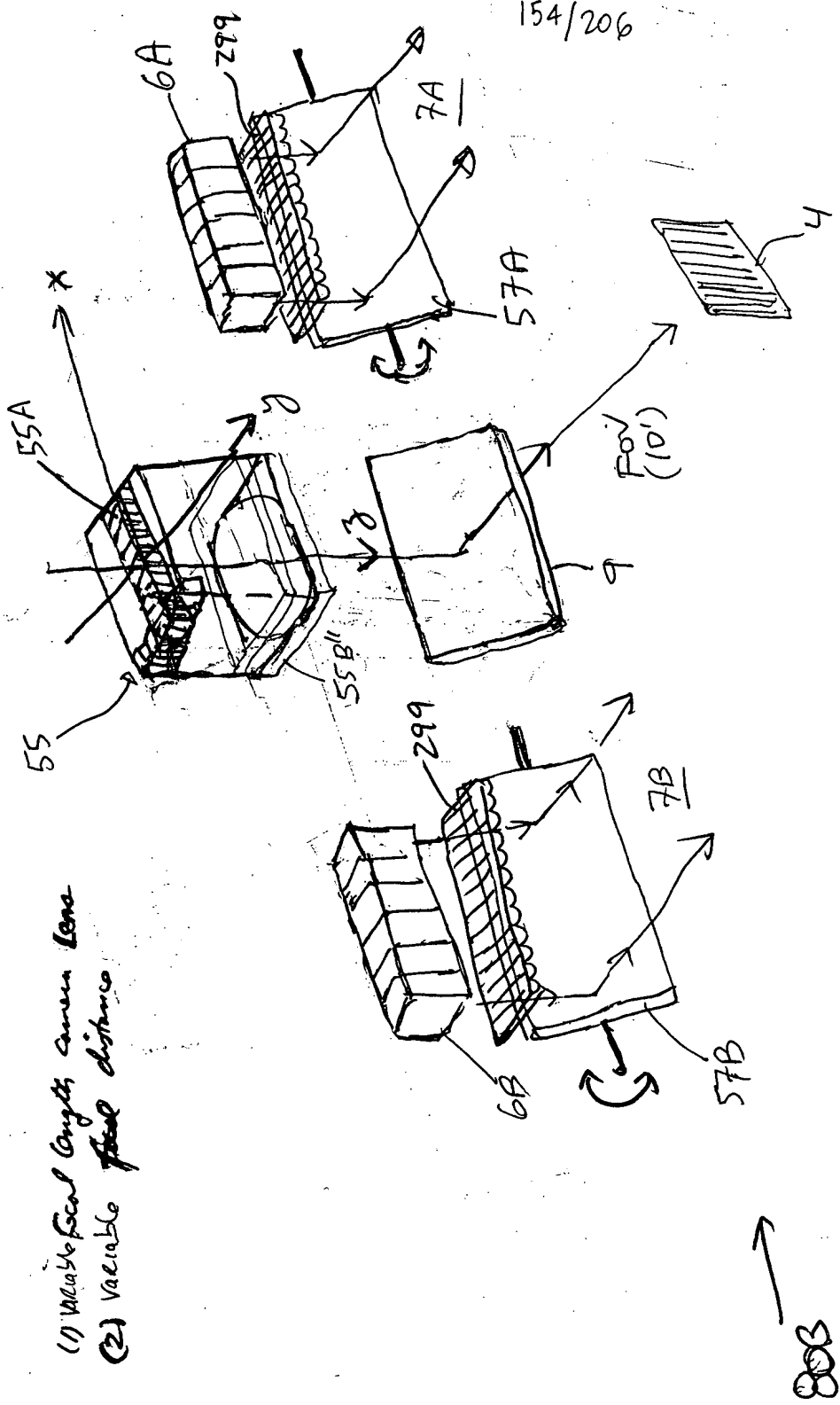


FIG. 6C2

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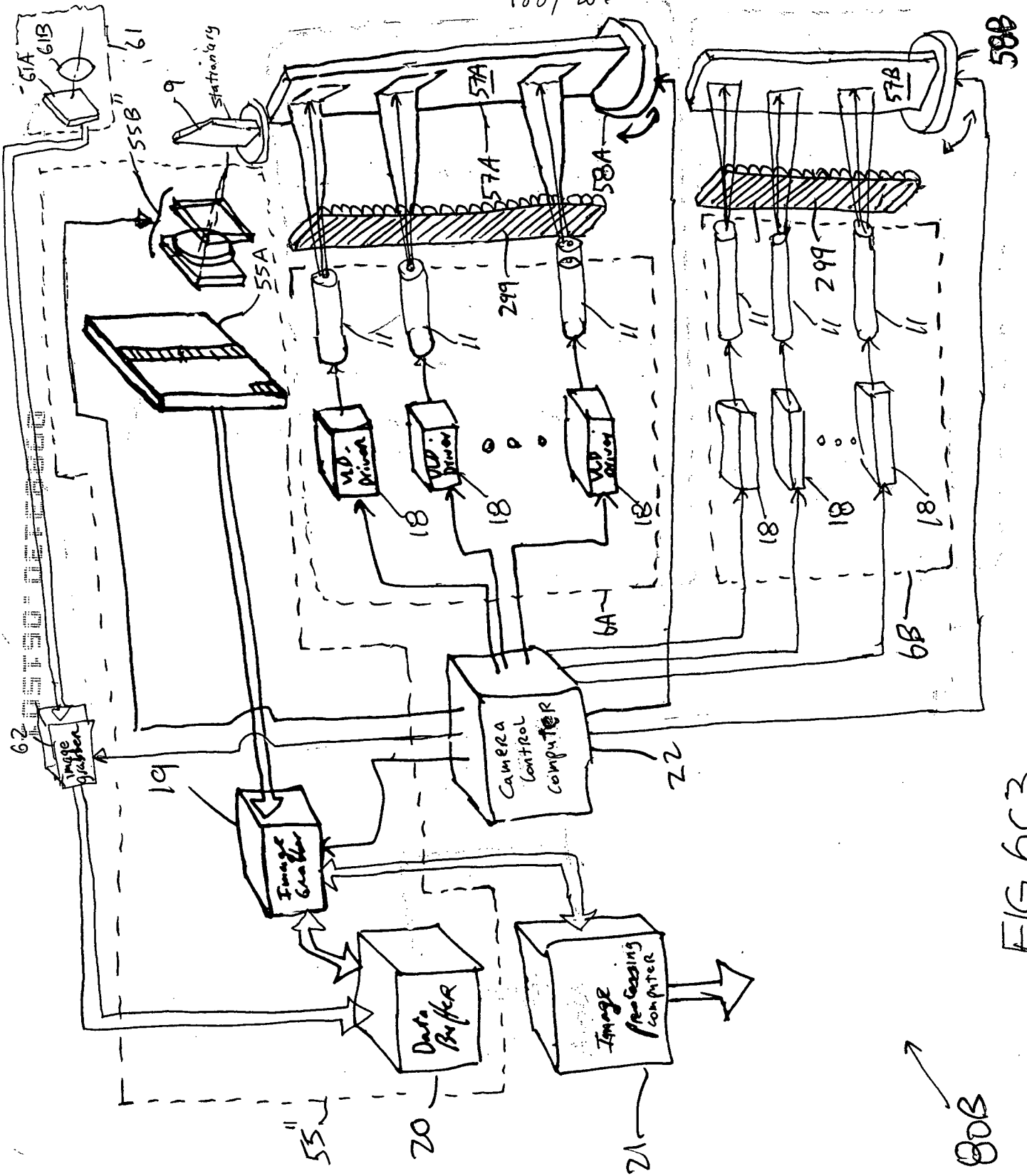


FIG. 6C3

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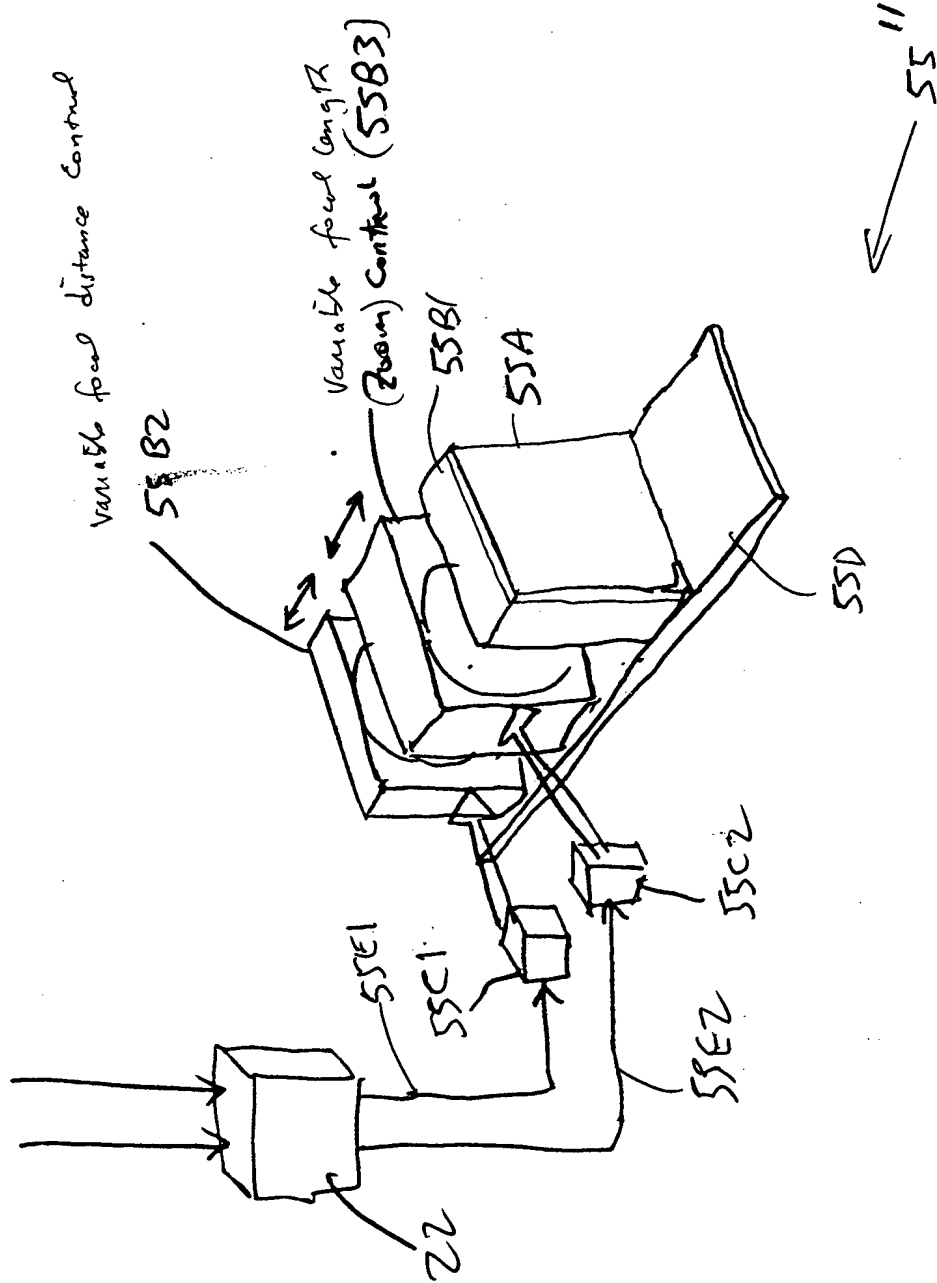


FIG. 6C4

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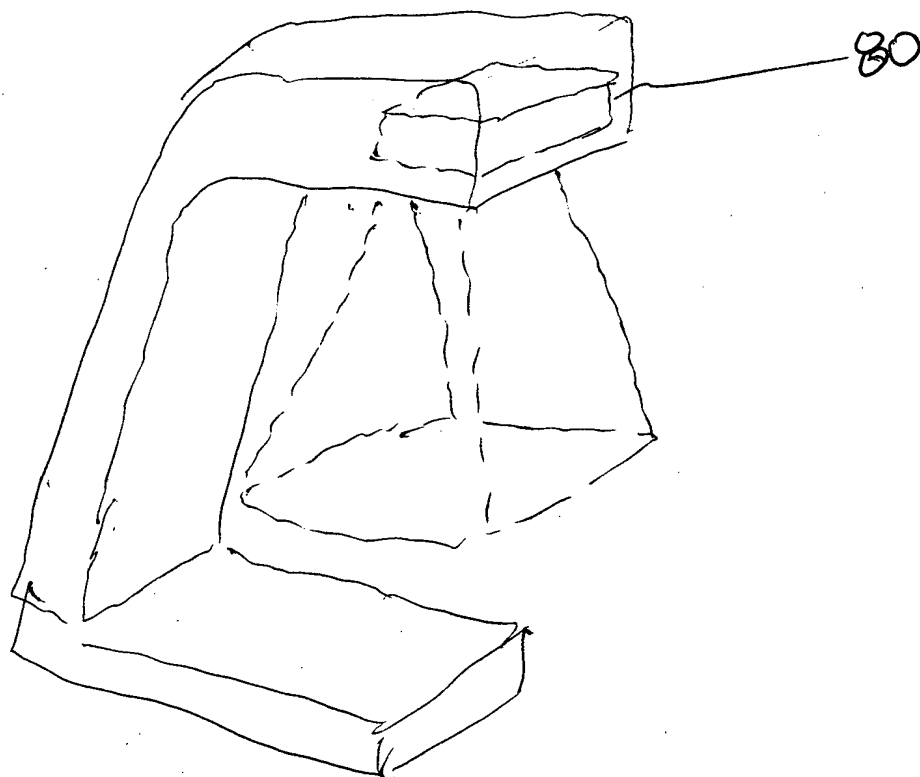


FIG. 6C5

FIG. 6C5

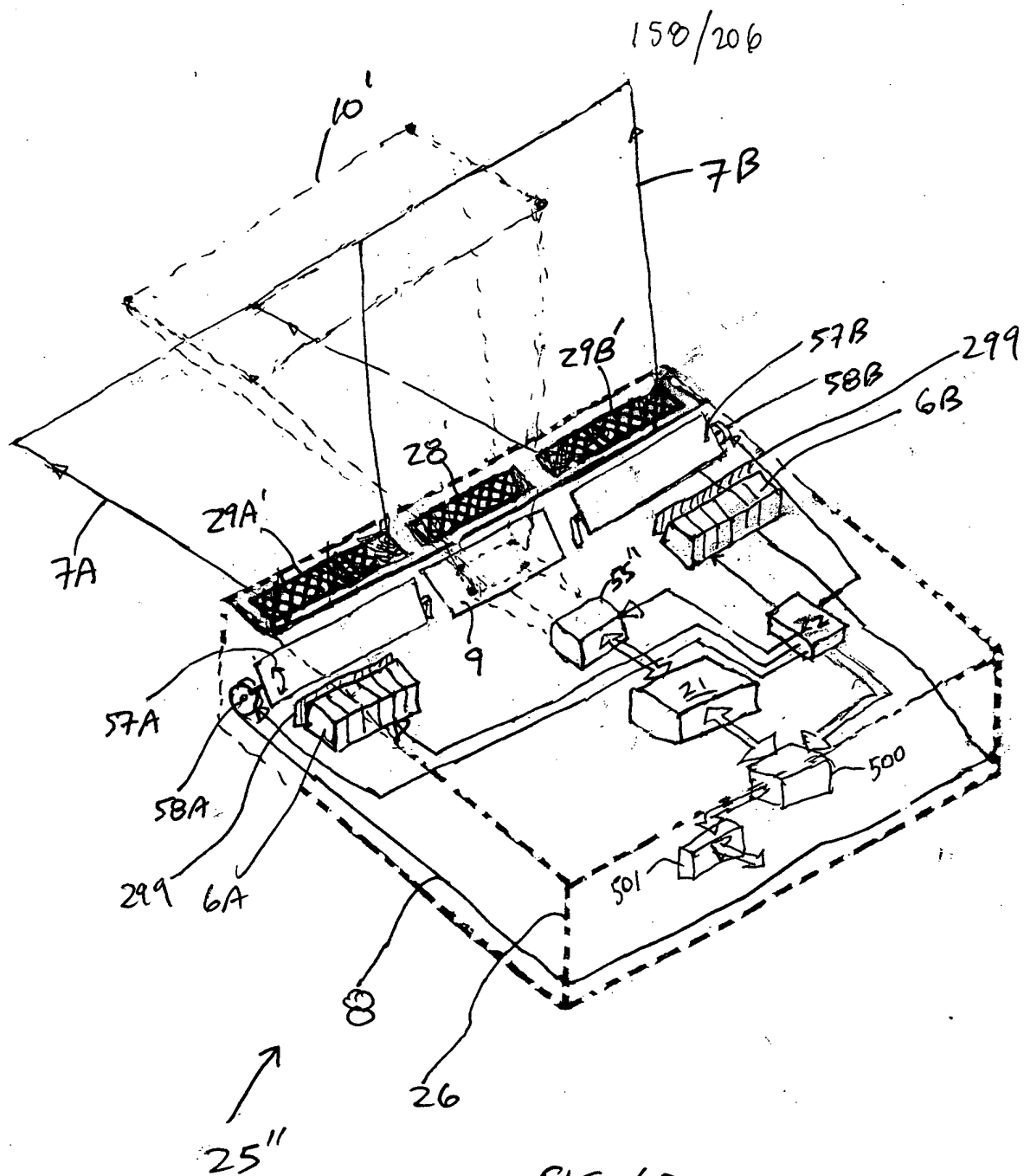


FIG. 6D1

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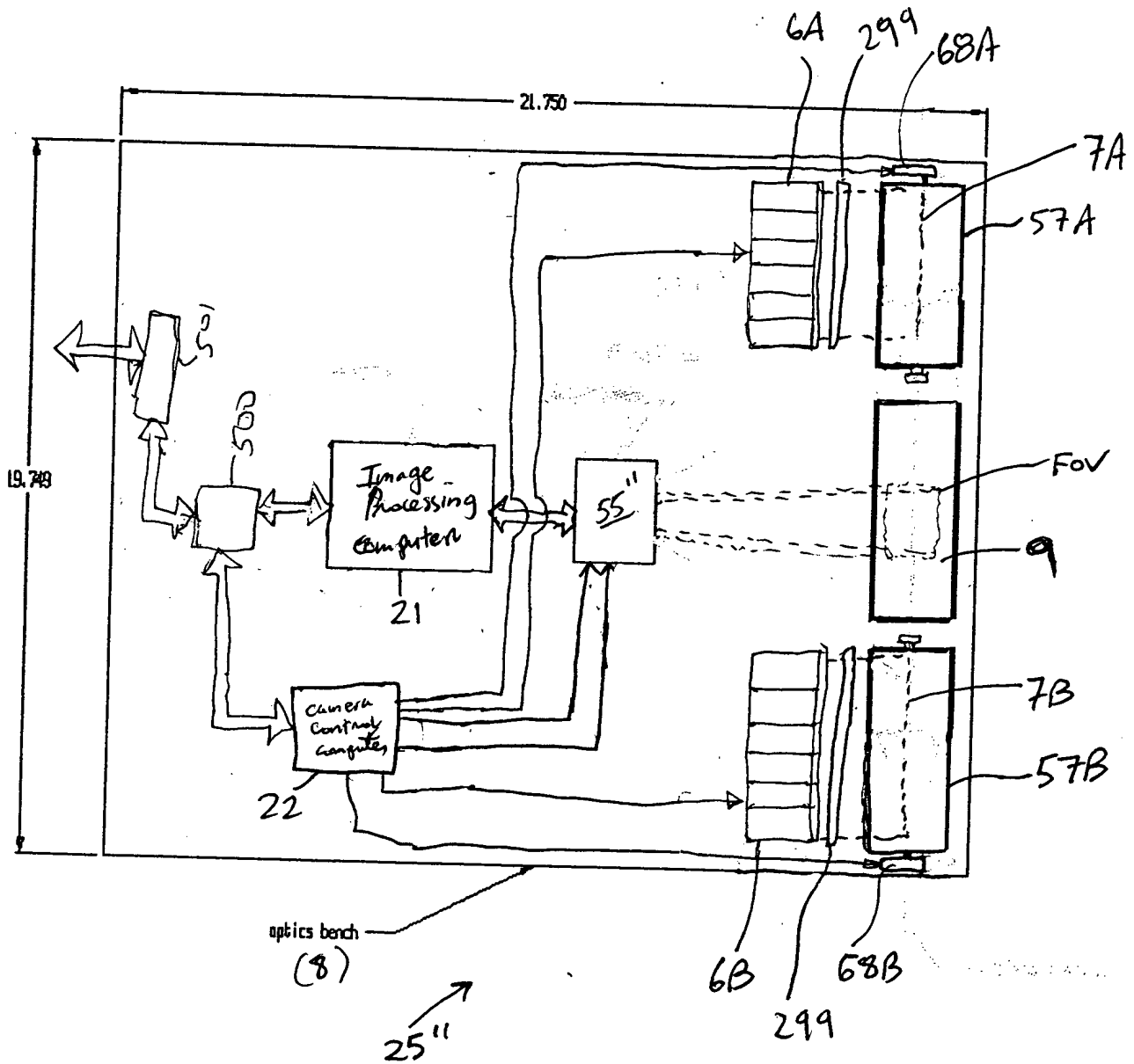
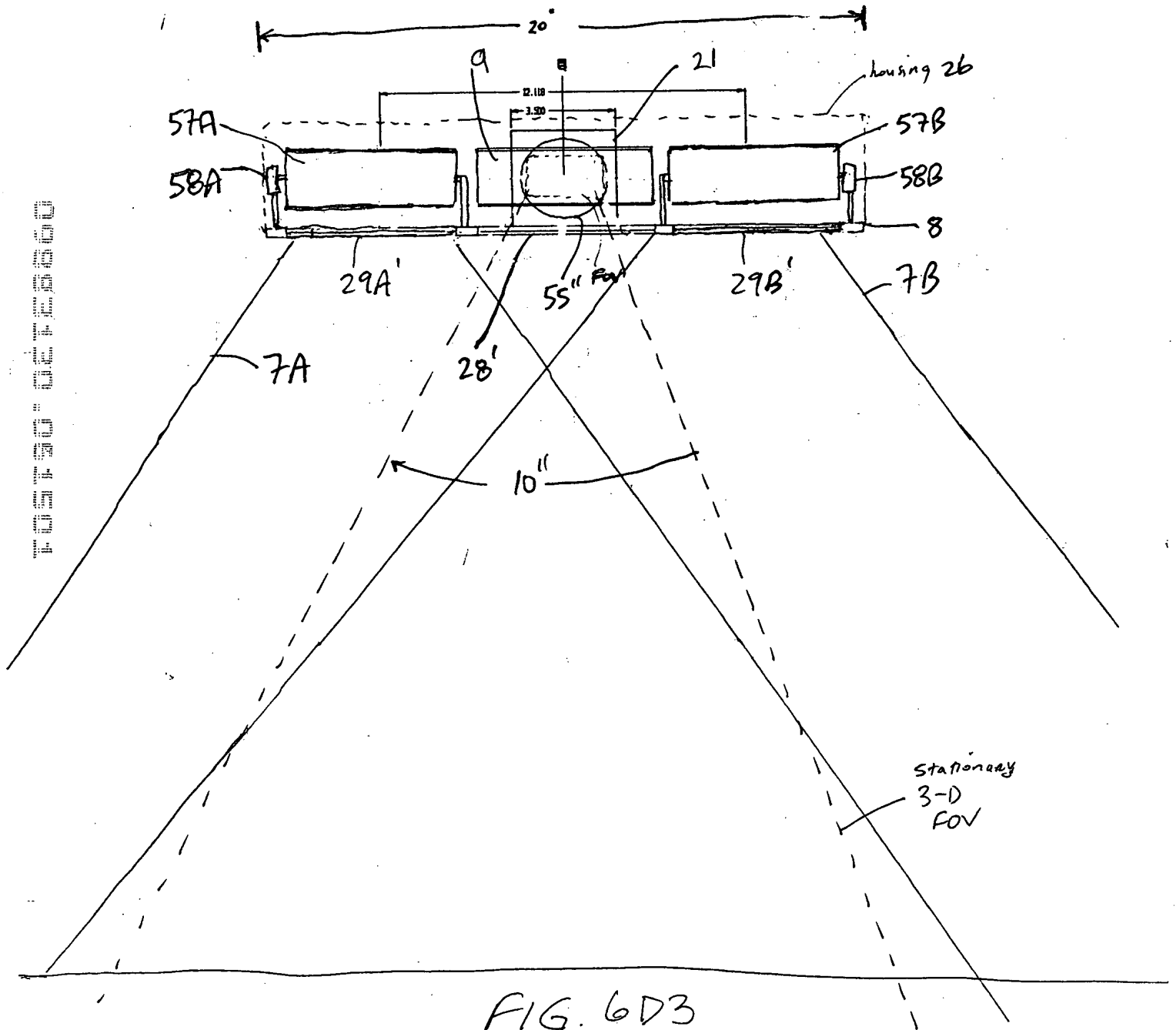


FIG. 6D2



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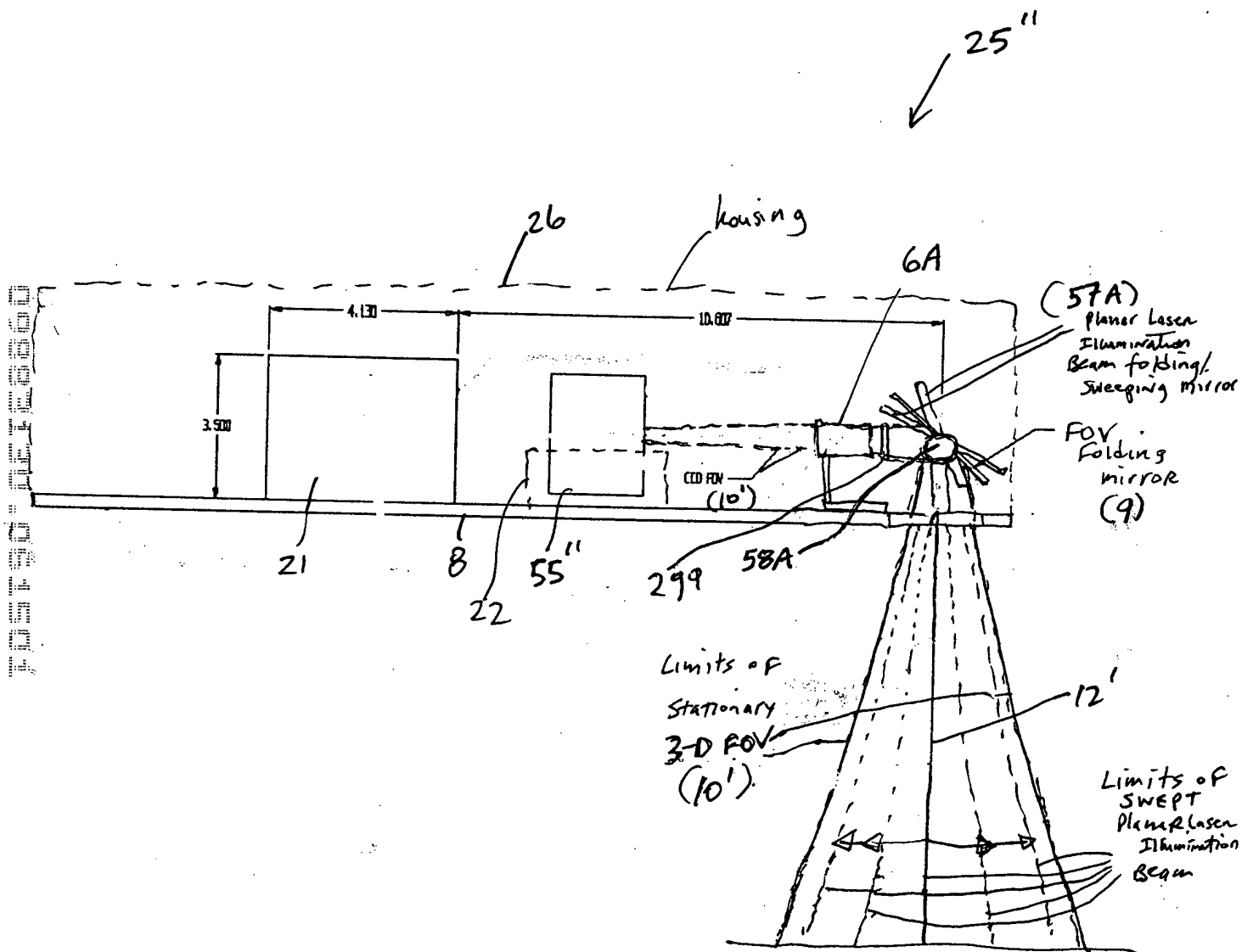


FIG. 6D4

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Variable FOV

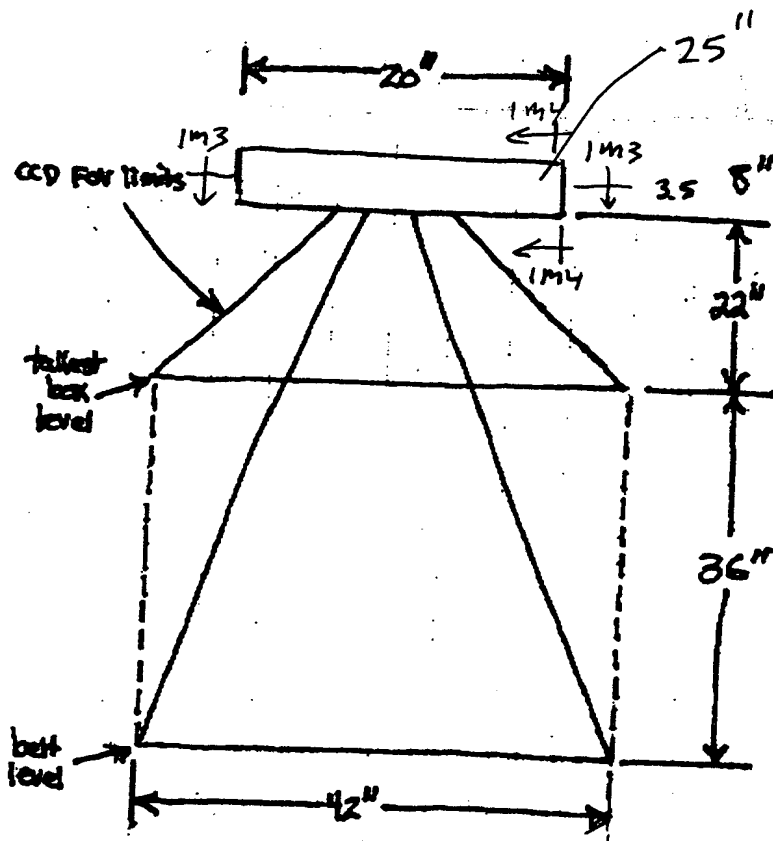


FIG. 6D5

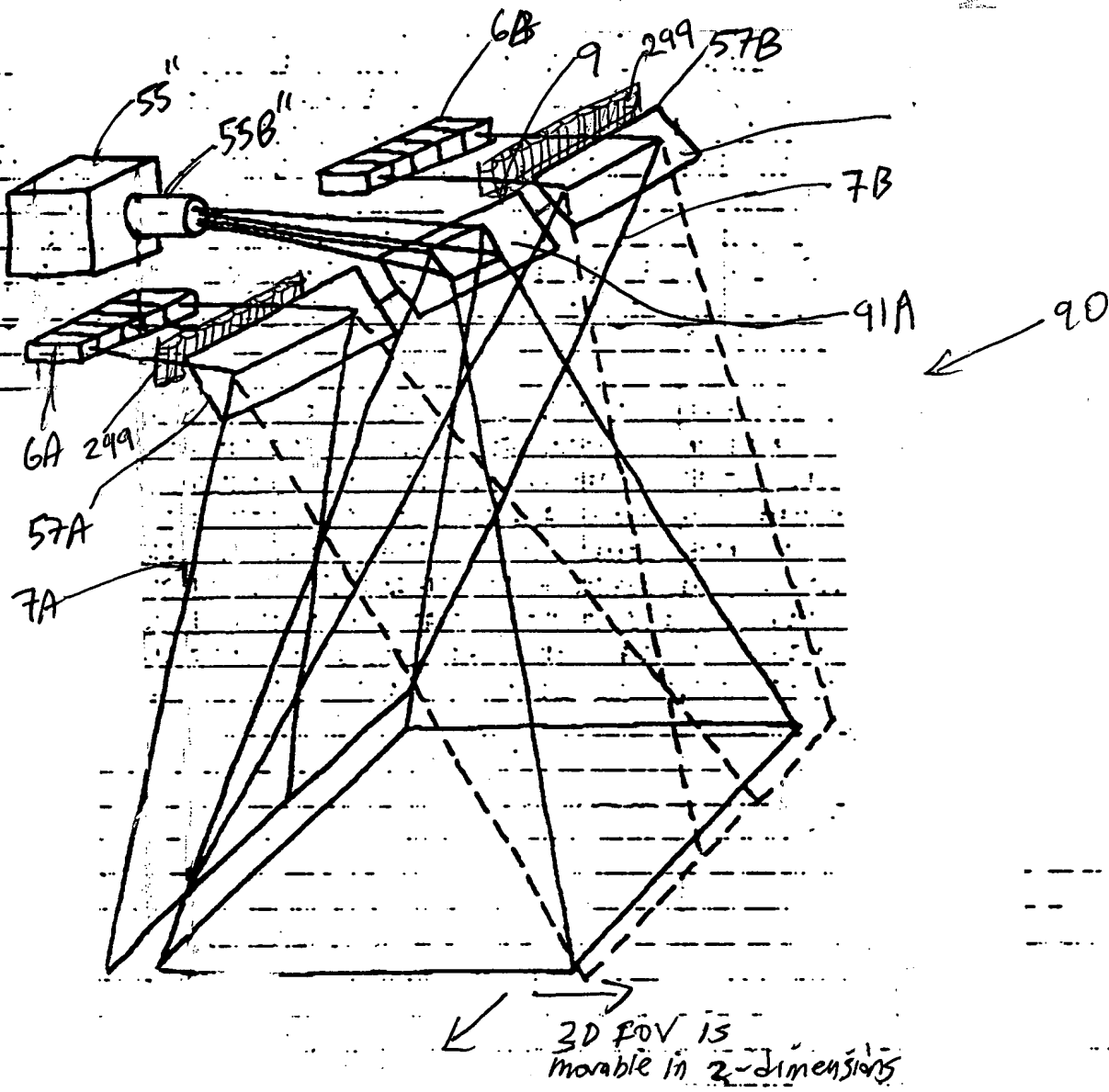
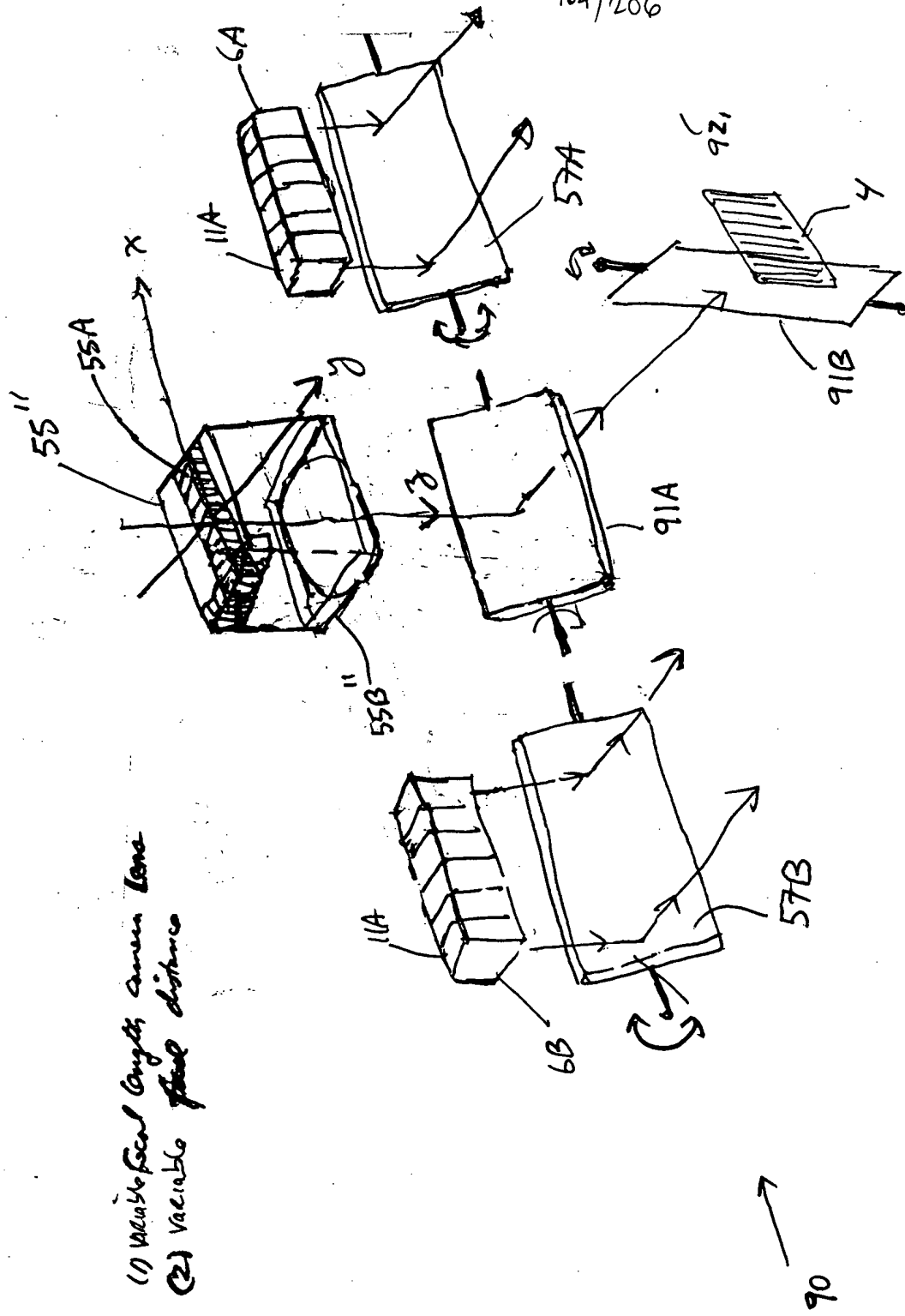


FIG 6E1



(1) Variable length inner lens  
(2) Variable fluid distance

FIG. 6E2

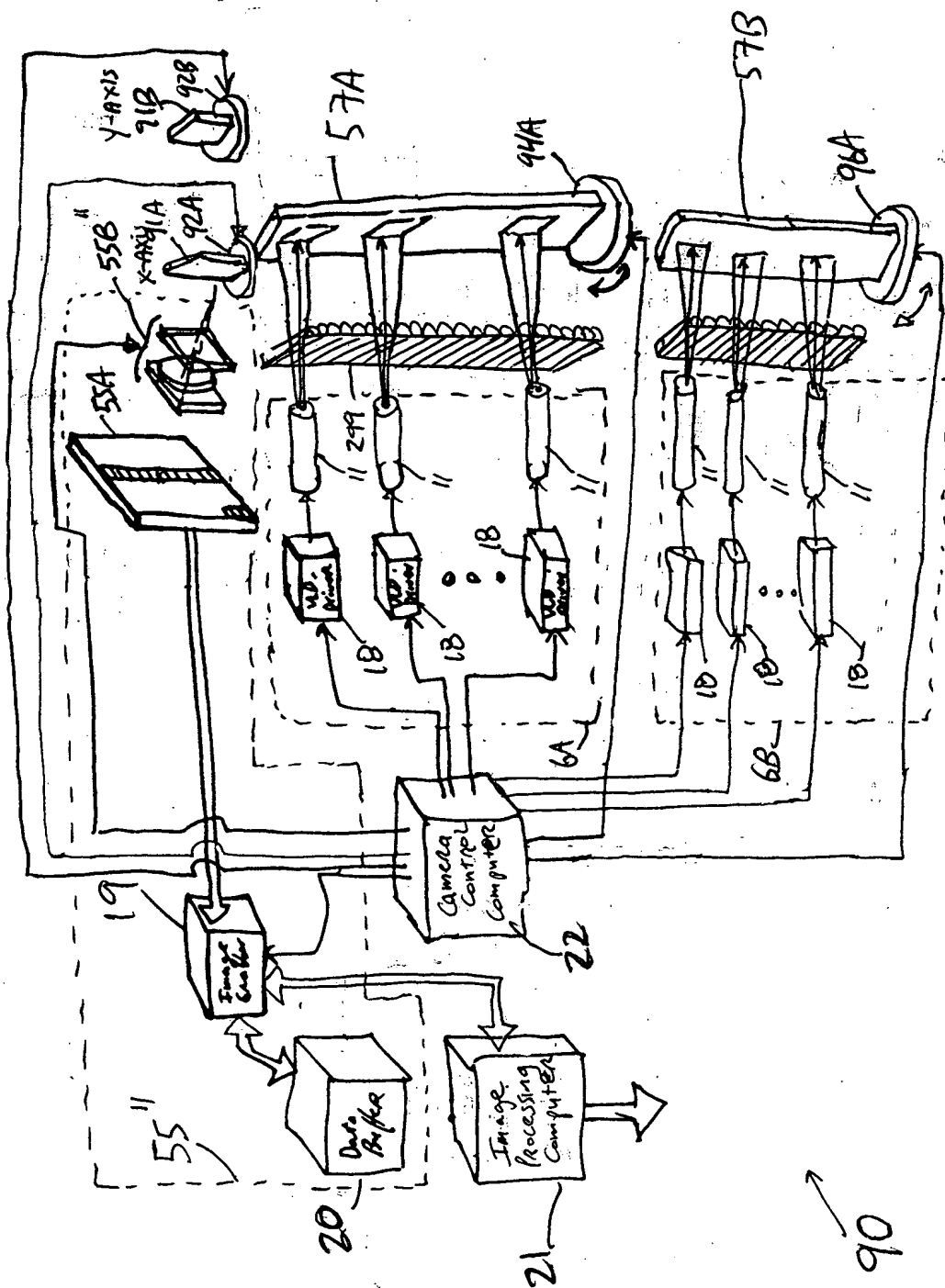


FIG. 6E3

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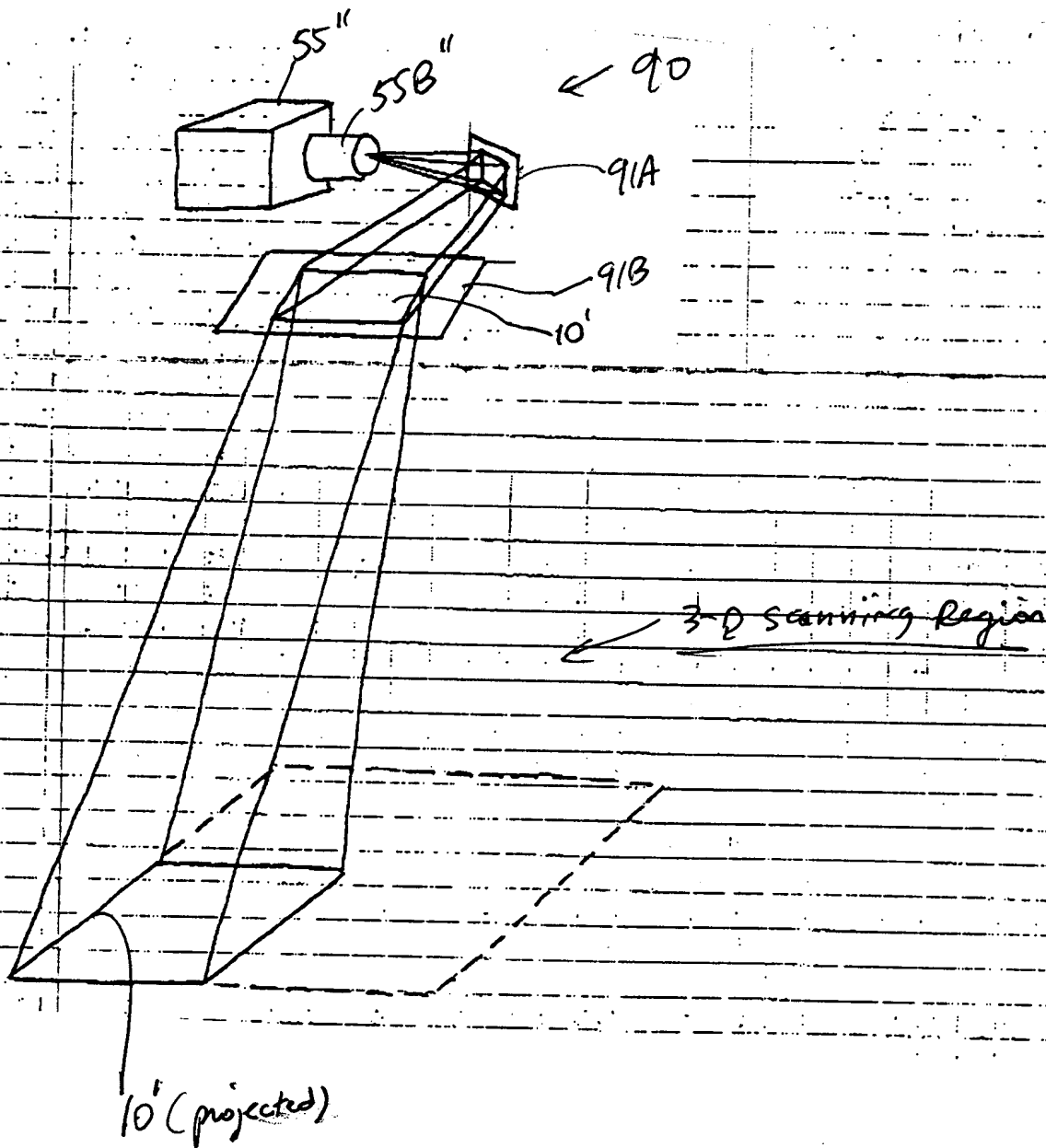
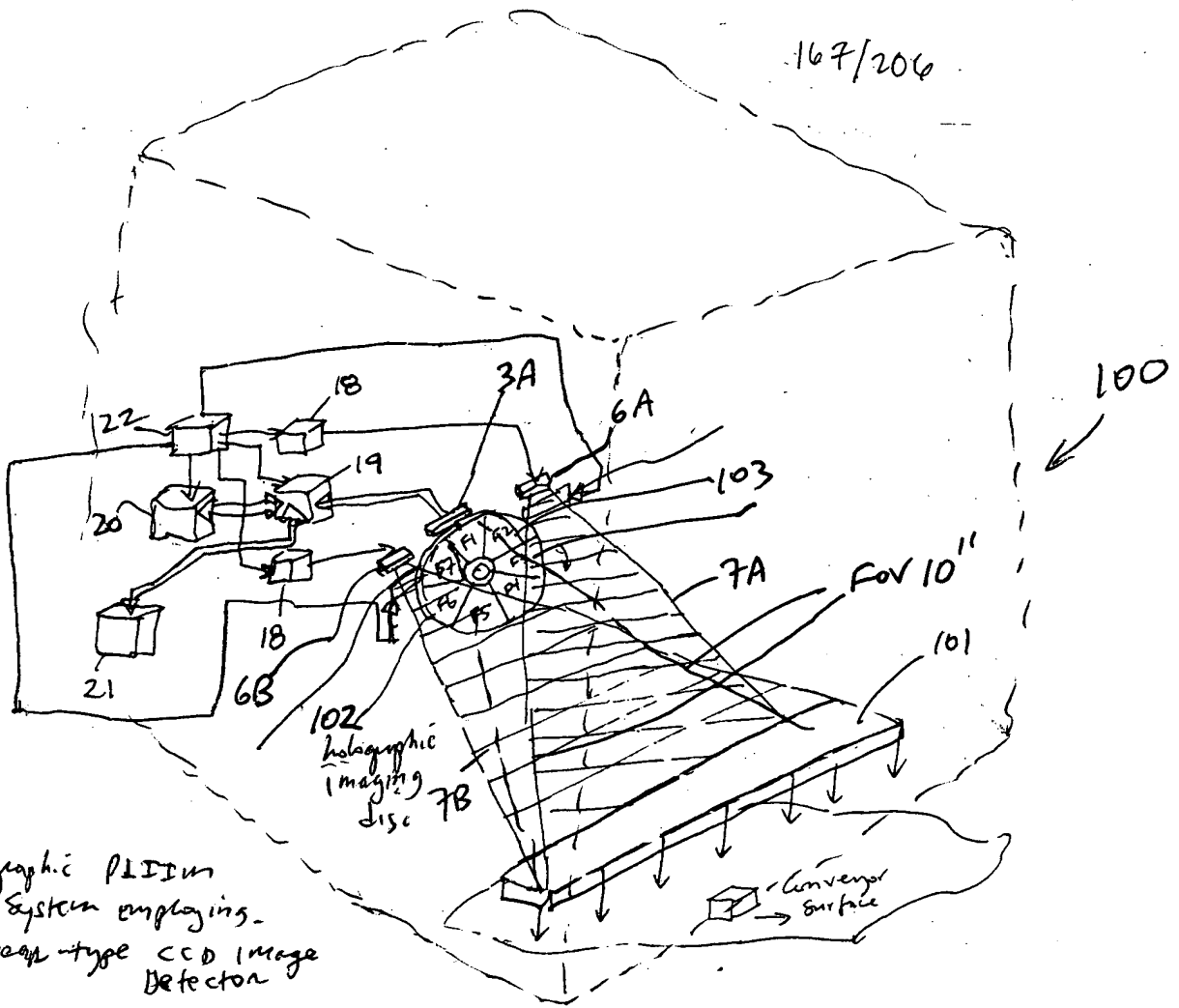


FIG. 6E4

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Holographic PLIIm  
System employing  
Linear-type CCD image  
Detector

FIG. 7A

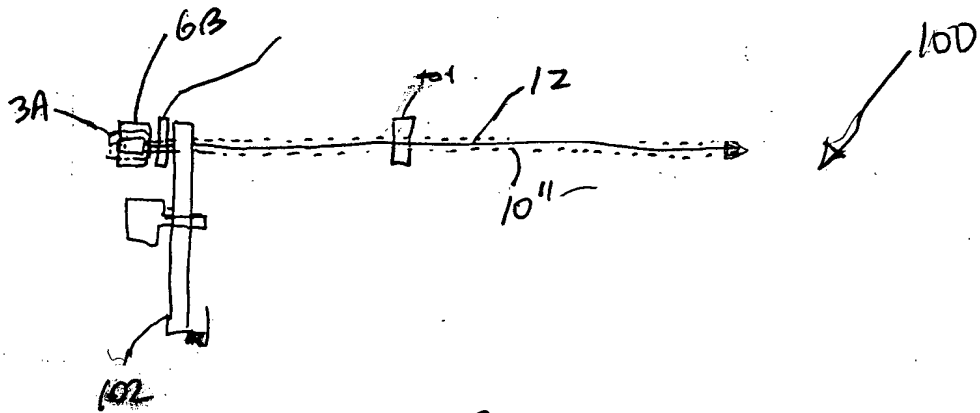


FIG. 7B



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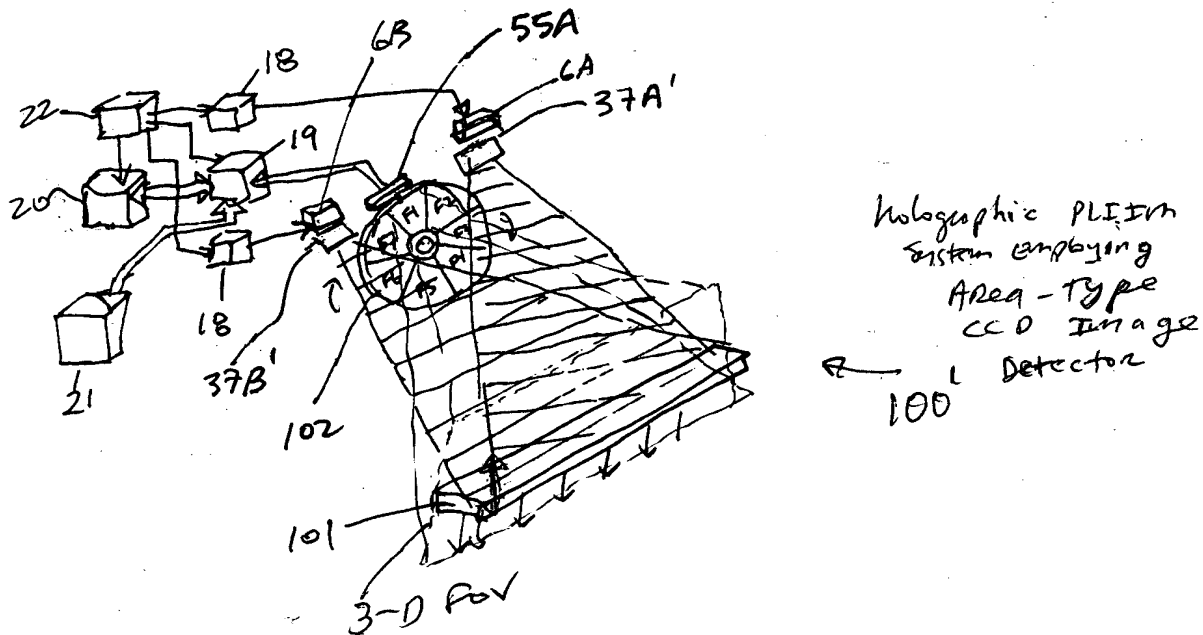


FIG. 8A

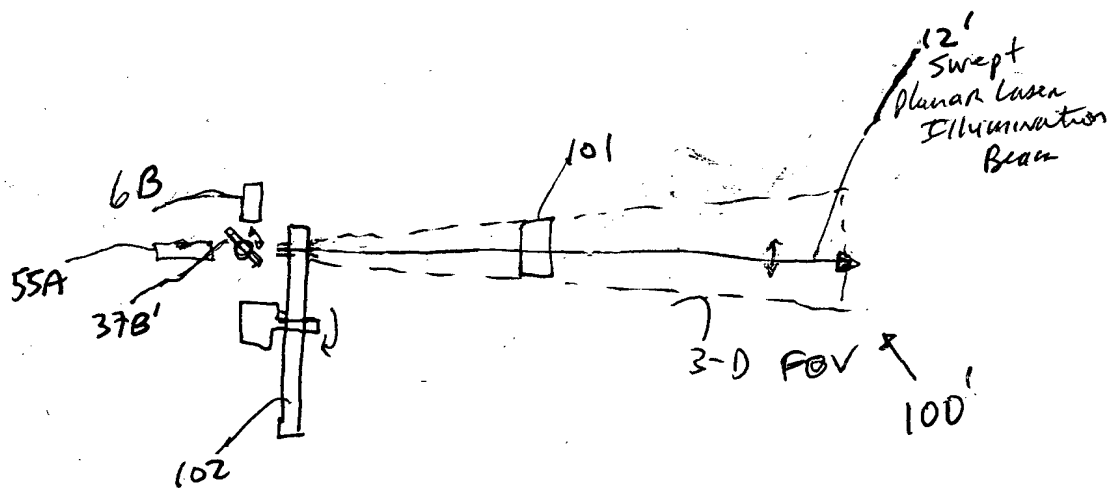


FIG. 8B

FIG. 8A

1-D CCD SCANNER EMBODIMENT

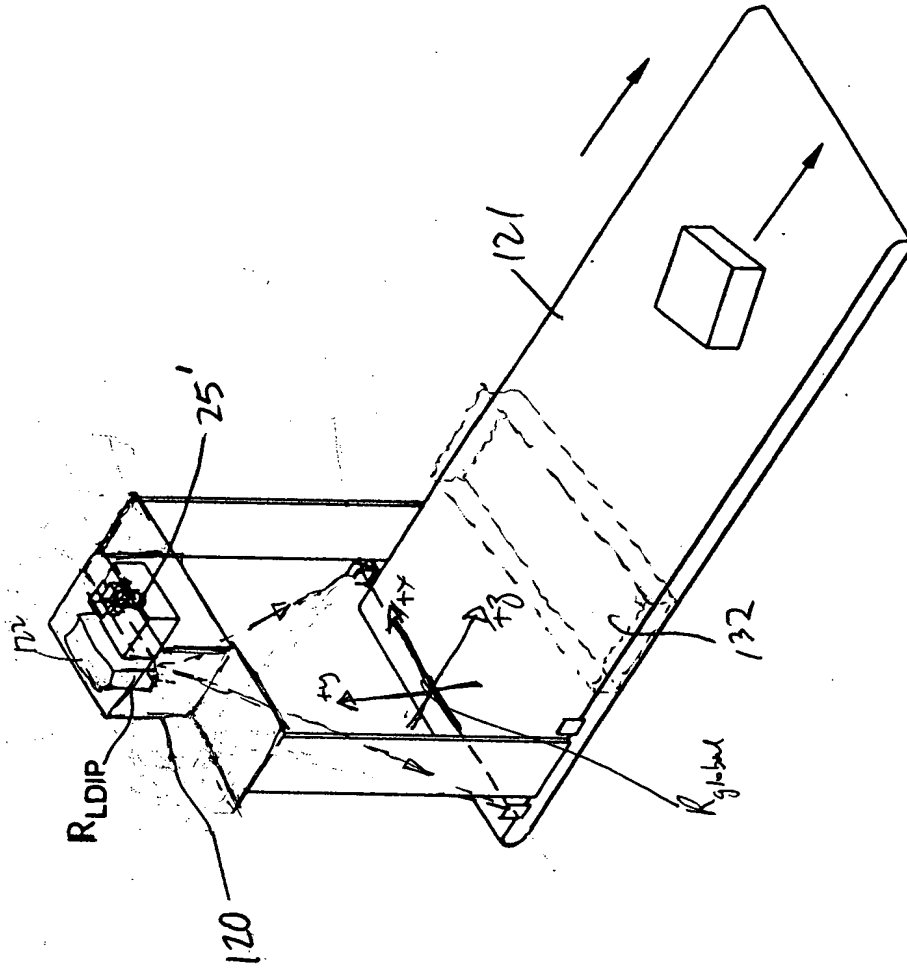


FIG. 9

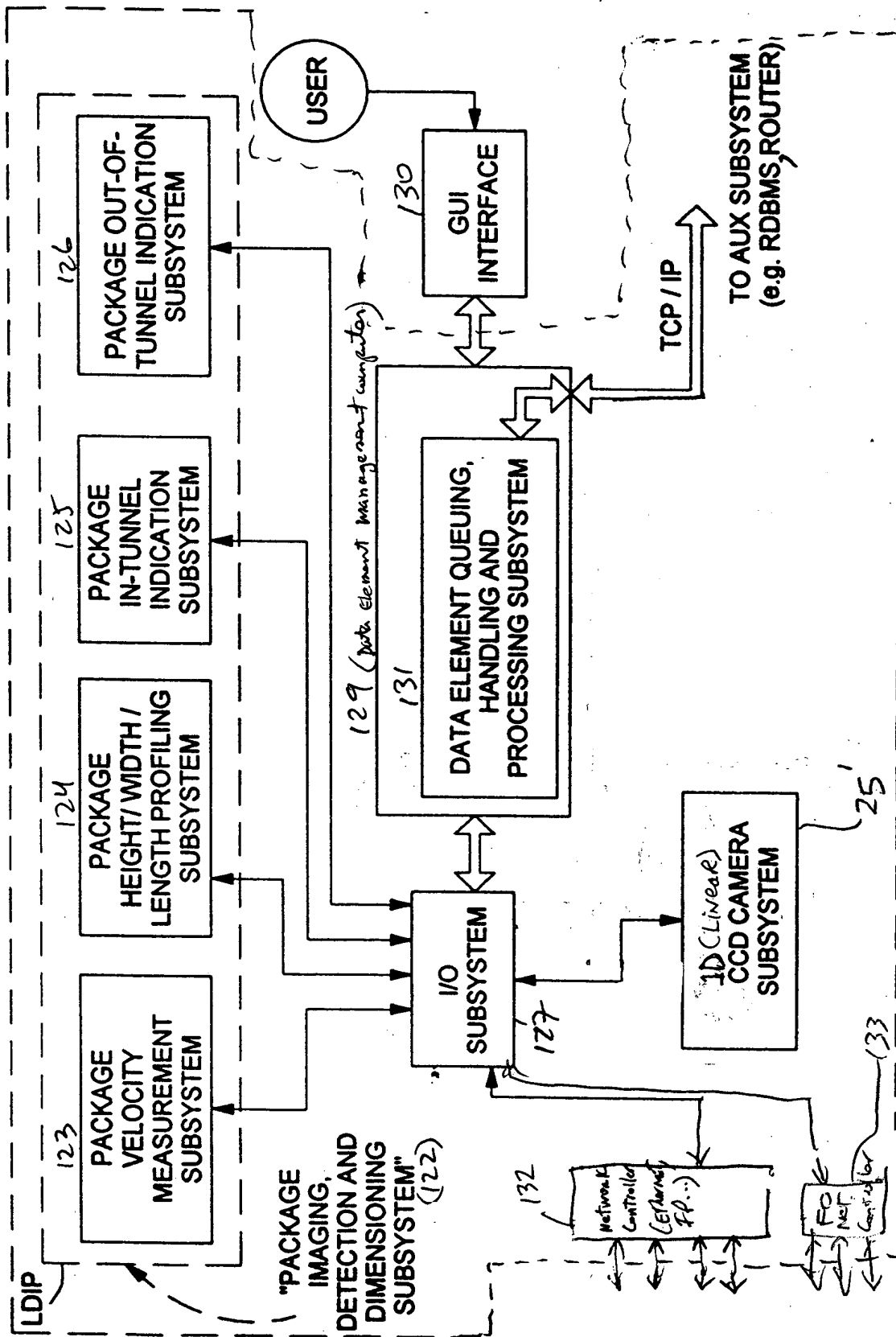


FIG. 10

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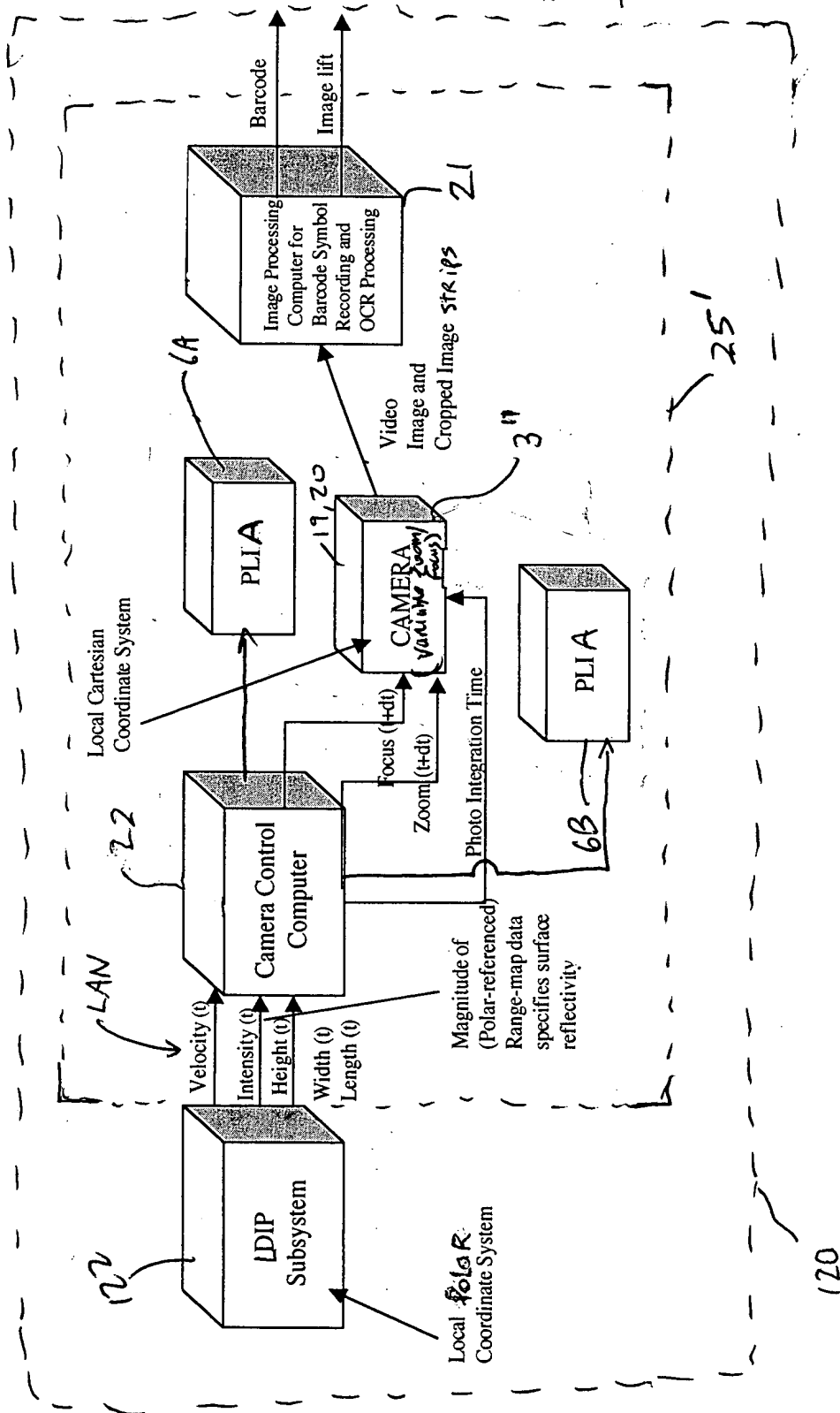


FIG. 11

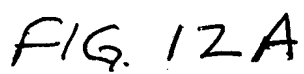
[illegible]

FIG. 12A

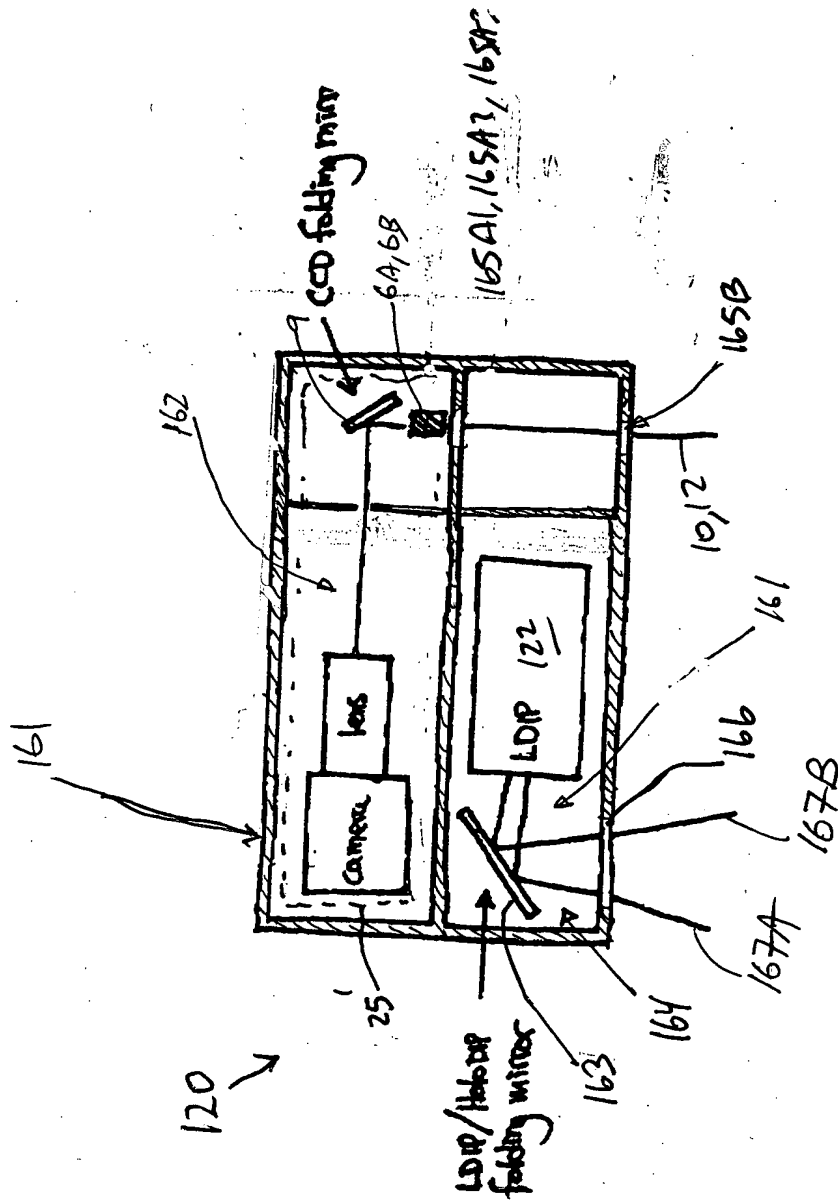


FIG. 12B

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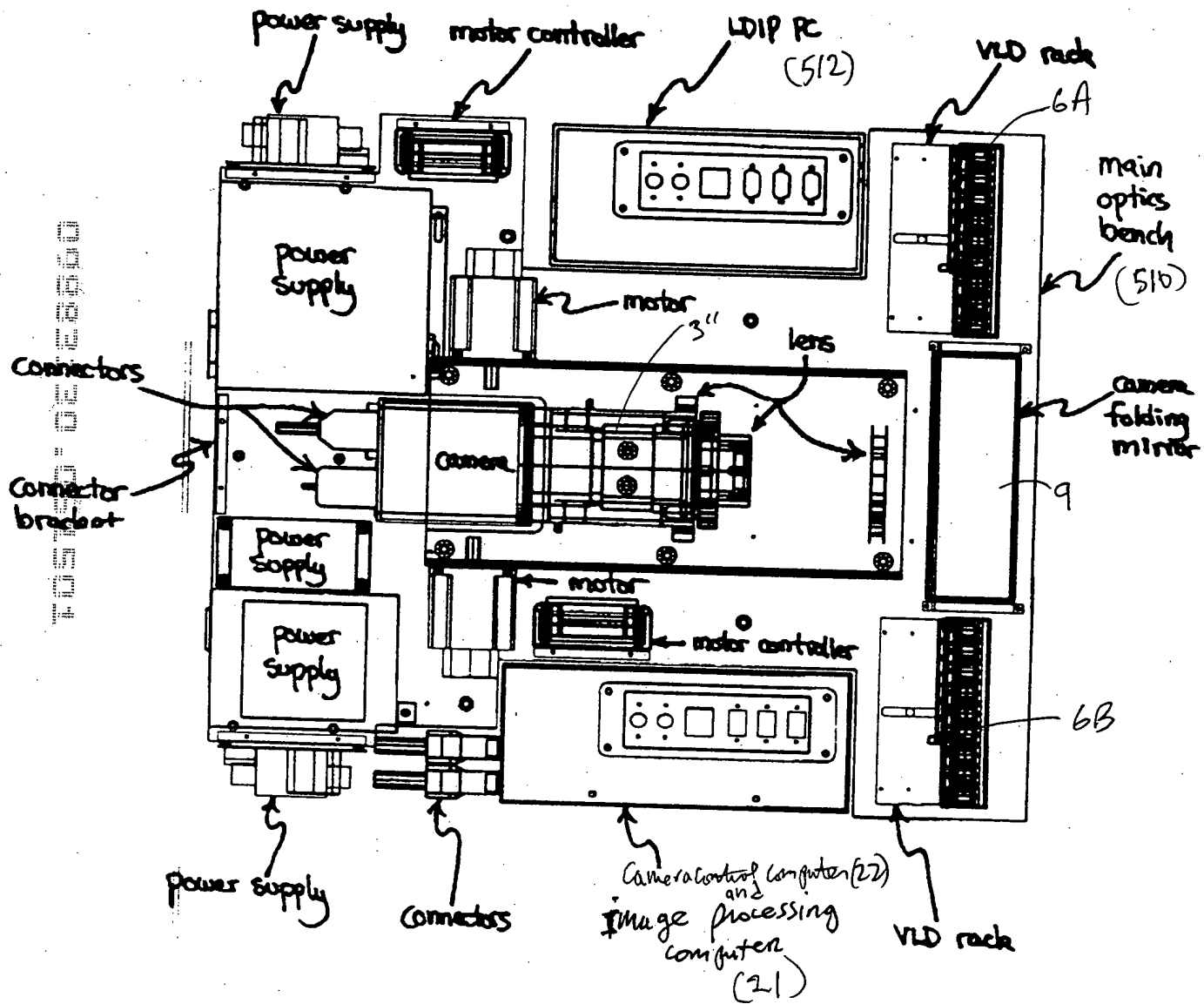


FIG. 12C

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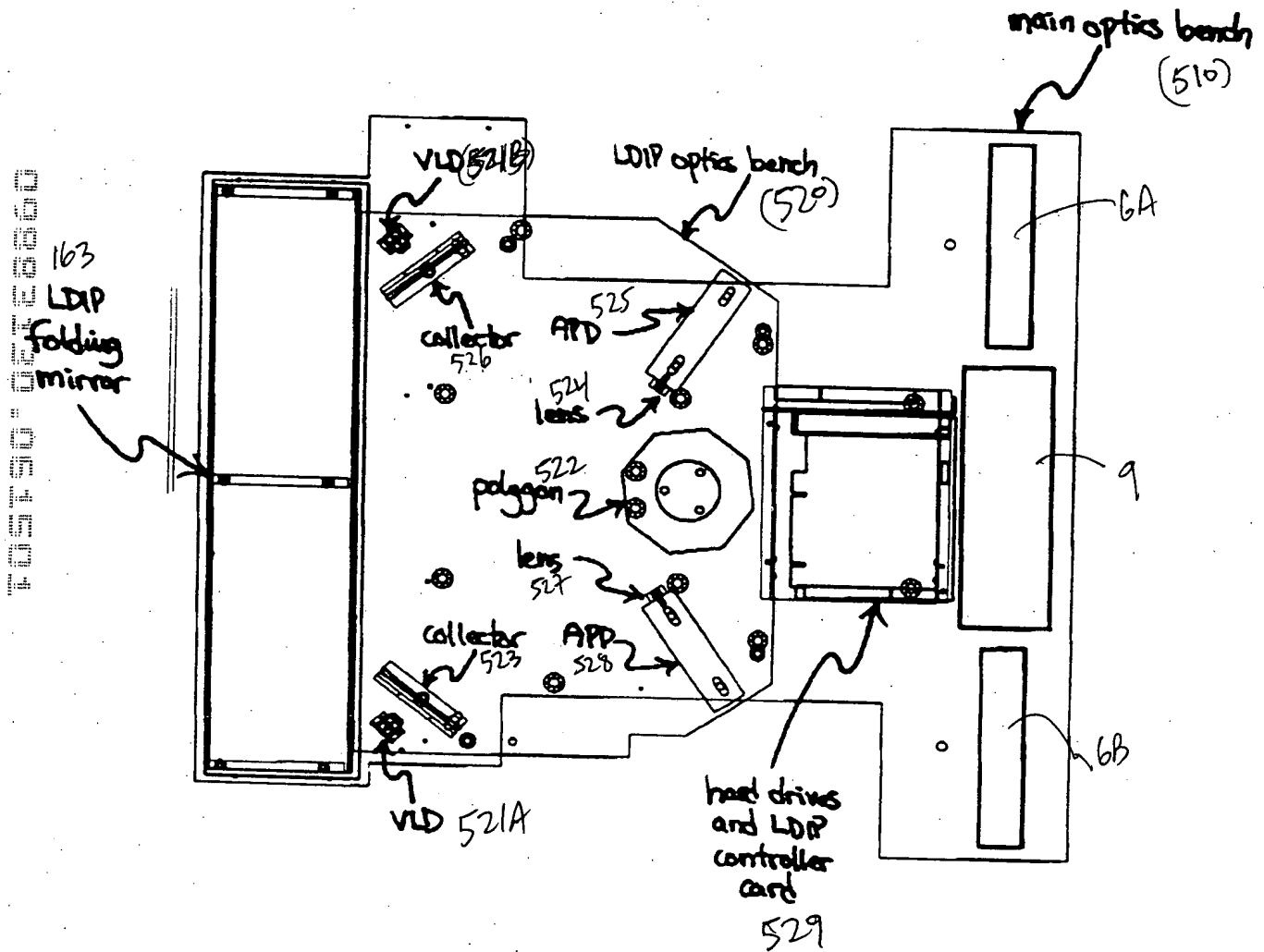
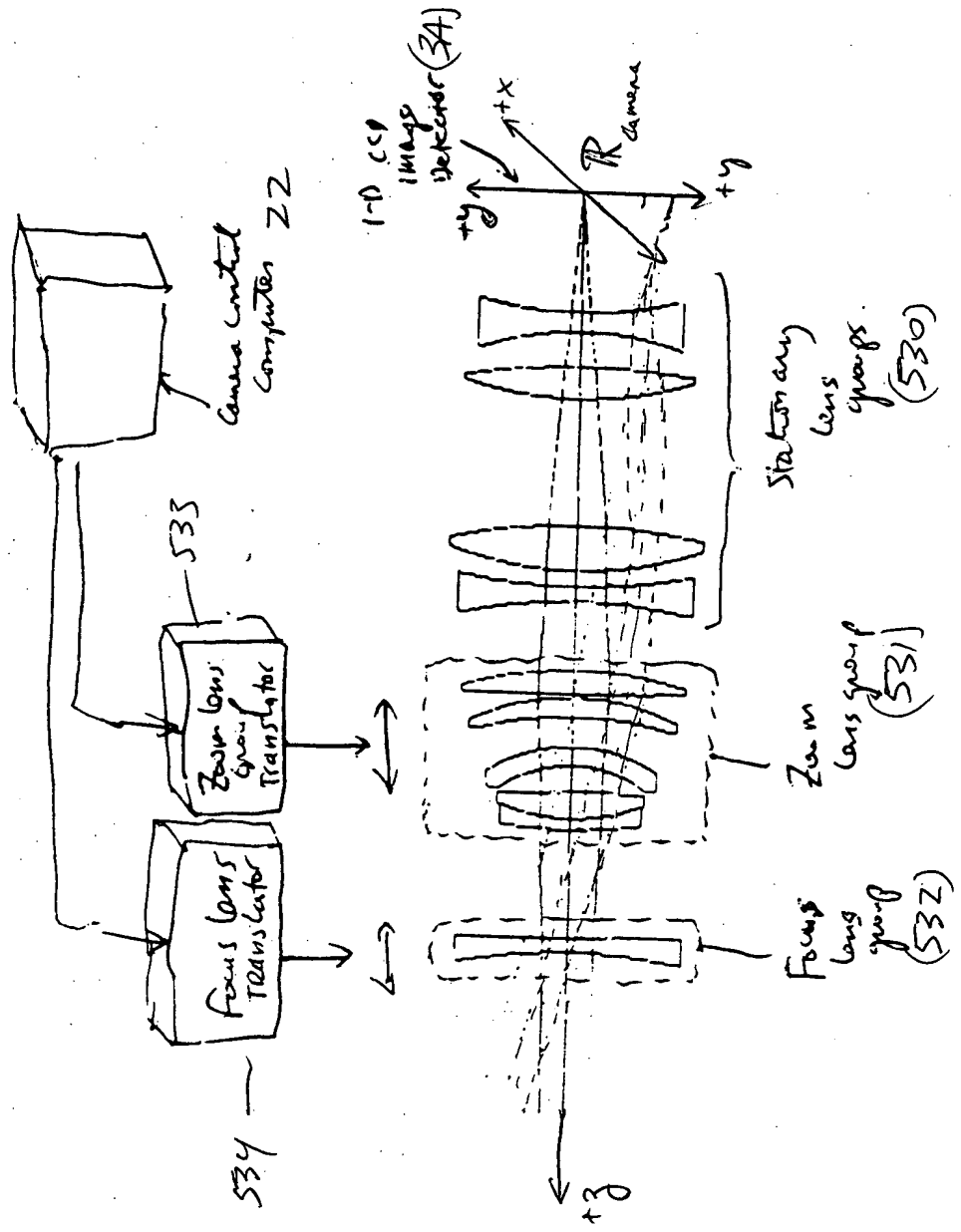


FIG. 12D



FOU-50-0616600

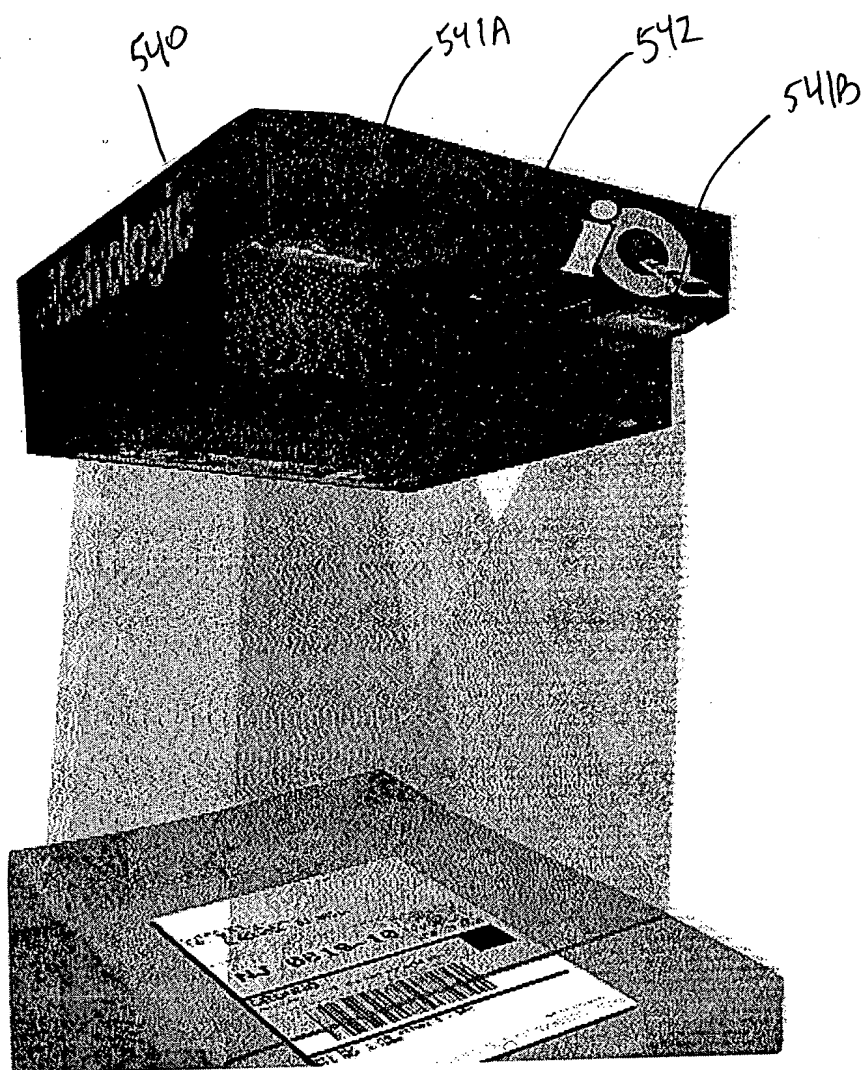
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(main optics)  
(Lens groups)

FIG. 12E

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[illegible]

FIG. 13B



FIG. 13C

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# PLLIM-BASED PACKAGE IDENTIFICATION AND DIMENSIONING (PID) SYSTEM

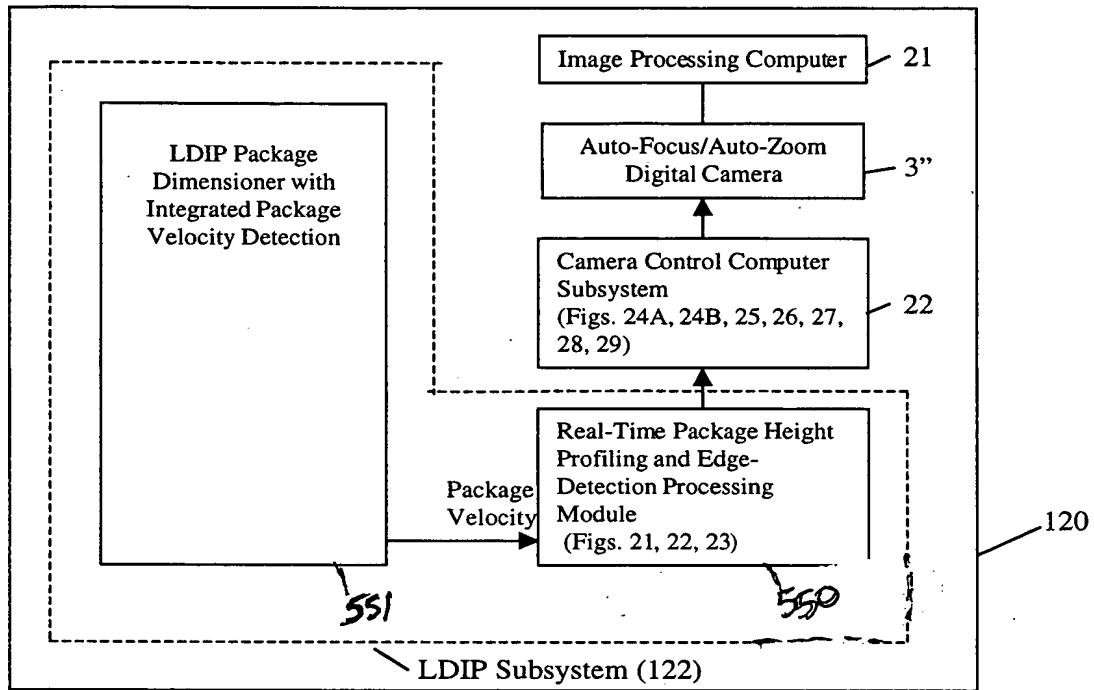


FIG. 14

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# LDIP REAL-TIME PACKAGE HEIGHT PROFILE AND EDGE DETECTION METHOD

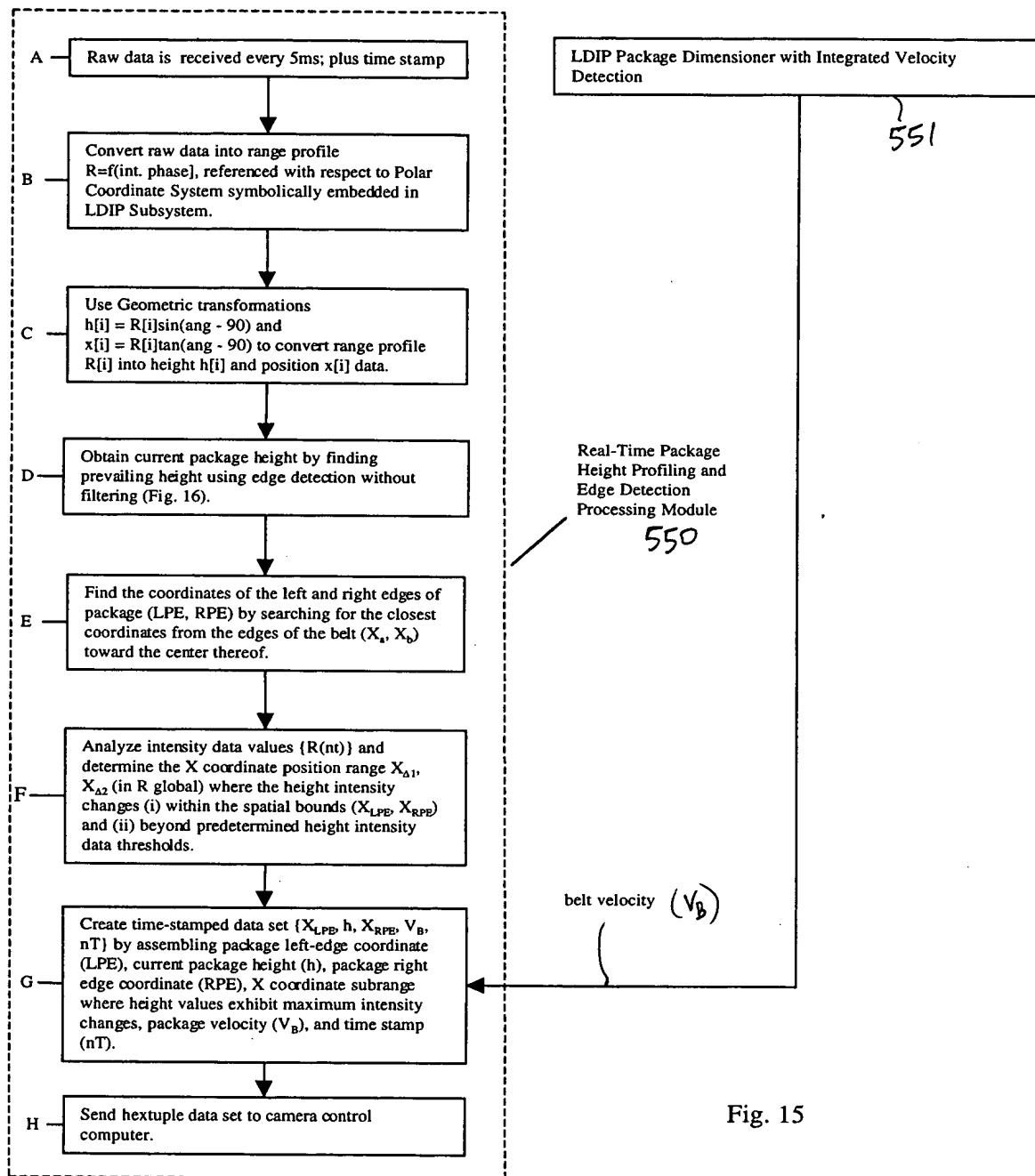
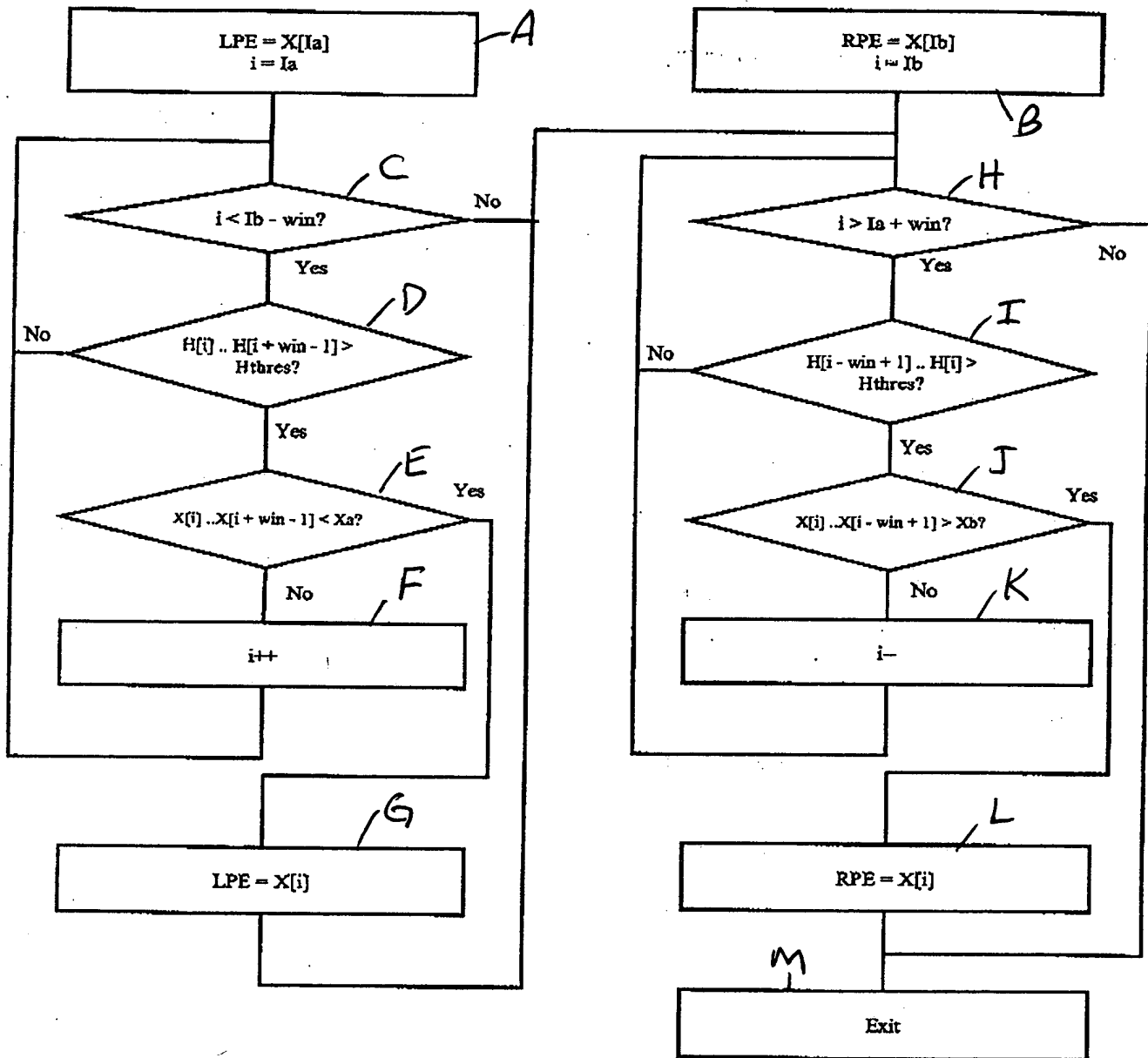


Fig. 15

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# LDIP Real Time Package Edge Detection



$Xa$  = location of belt left edge;  $Xb$  = location of belt right edge  
 $Ia$  = belt edge edge pixel;  $Ib$  = belt right edge pixel  
 $LPE$  = Left package edge;  $RPE$  = Right package edge  
 $H[]$  = Pixel height array;  $X[]$  = Pixel location array  
 $win$  = package detection window

FIG. 16

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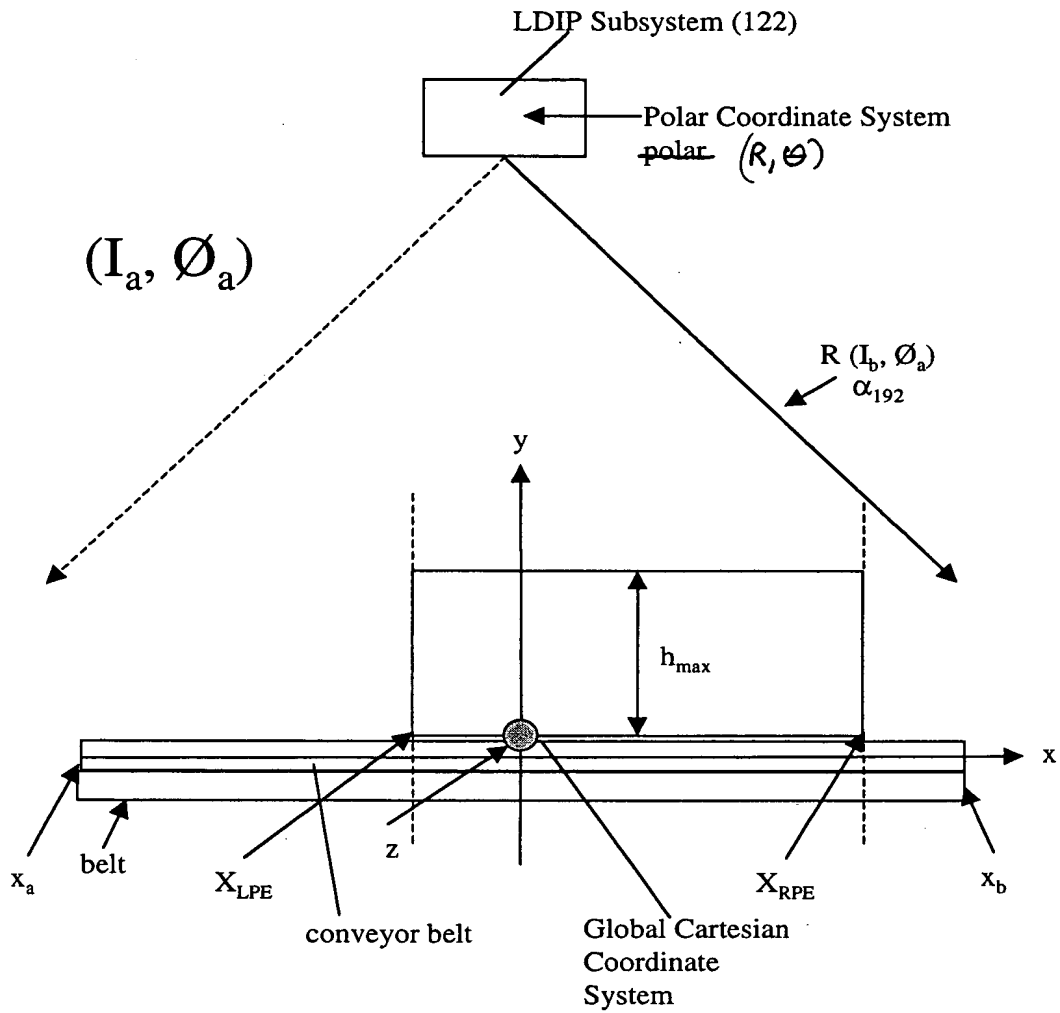


Fig. 17

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# INFORMATION MEASURED AT SCAN ANGLES BEFORE COORDINATE TRANSFORMS

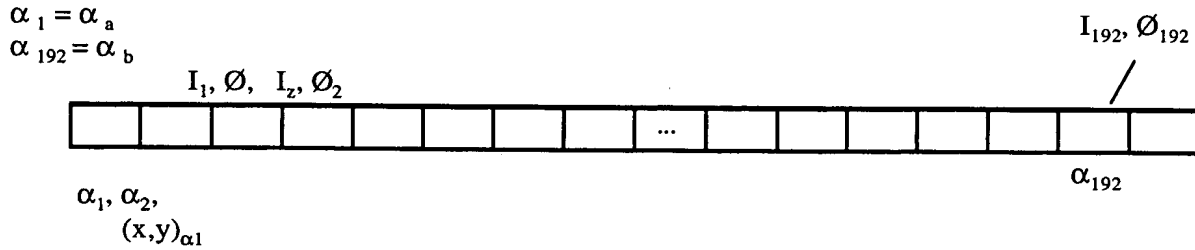


Fig. 17A

# RANGE AND POLAR ANGLE MEASURES TAKEN AT SCAN ANGLE $\alpha$ BEFORE COORDINATE TRANSFORMS

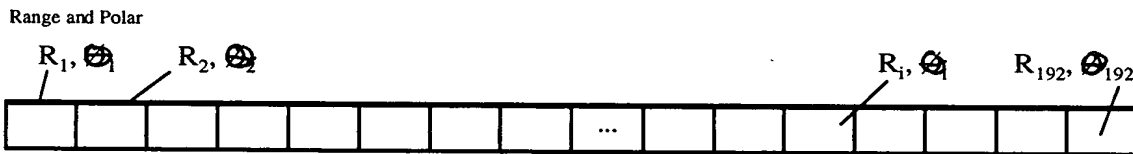


Fig. 17B

# MEASURED PACKAGE HEIGHT AND POSITION VALUES AFTER COORDINATE TRANSFORMS

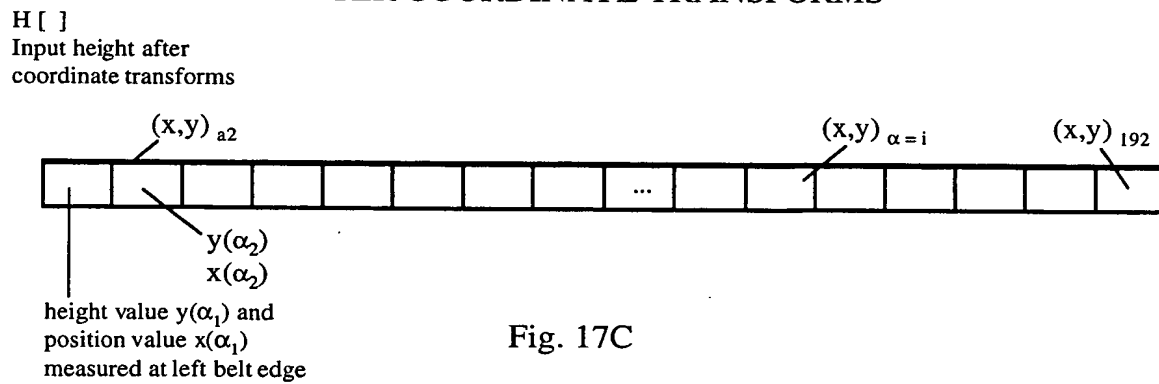


Fig. 17C



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# CAMERA CONTROL PROCESS CARRIED OUT WITHIN THE CAMERA CONTROL SUBSYSTEM OF EACH OBJECT ATTRIBUTE ACQUISITION AND ANALYSIS SYSTEM

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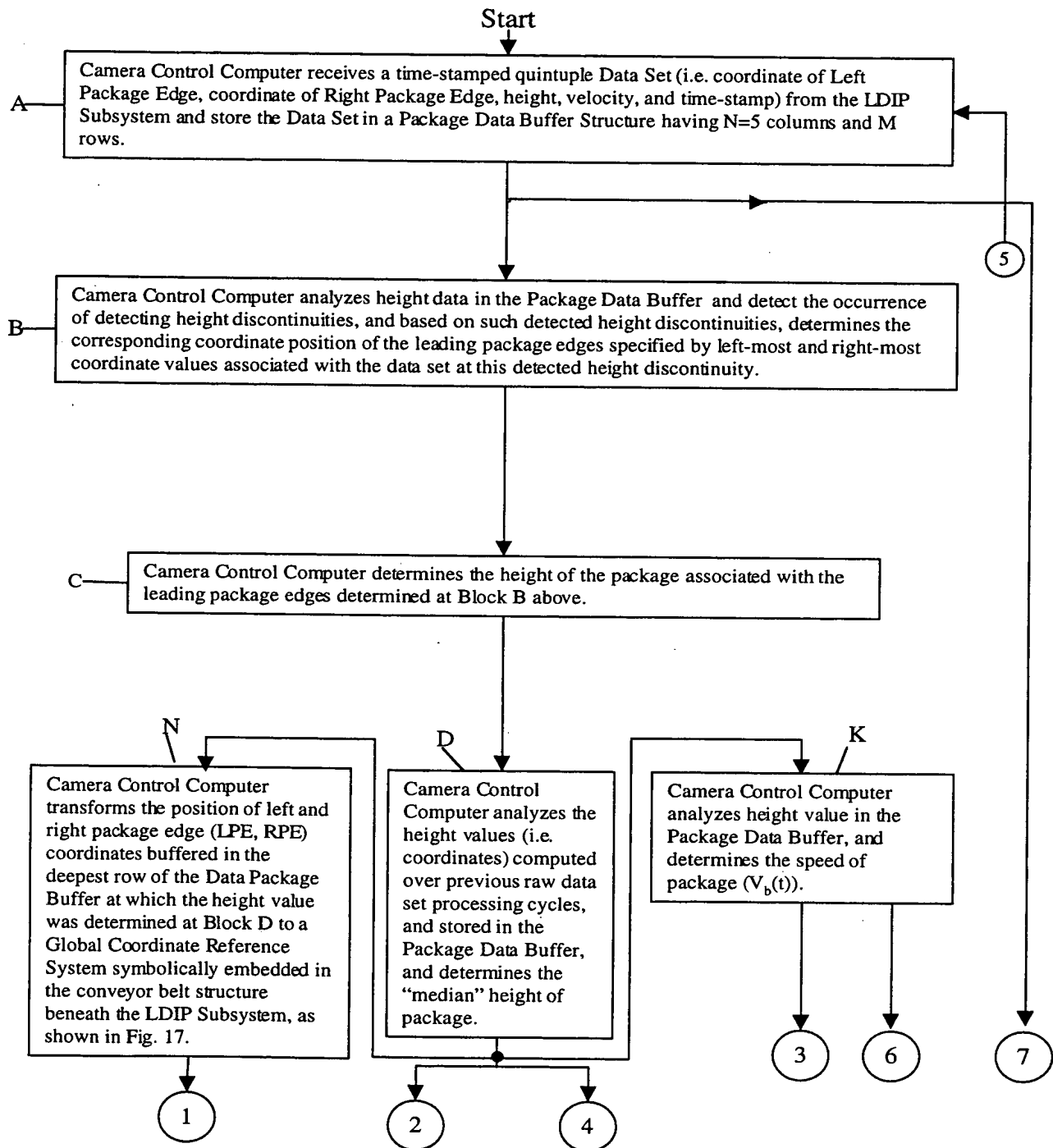


Fig. 18A

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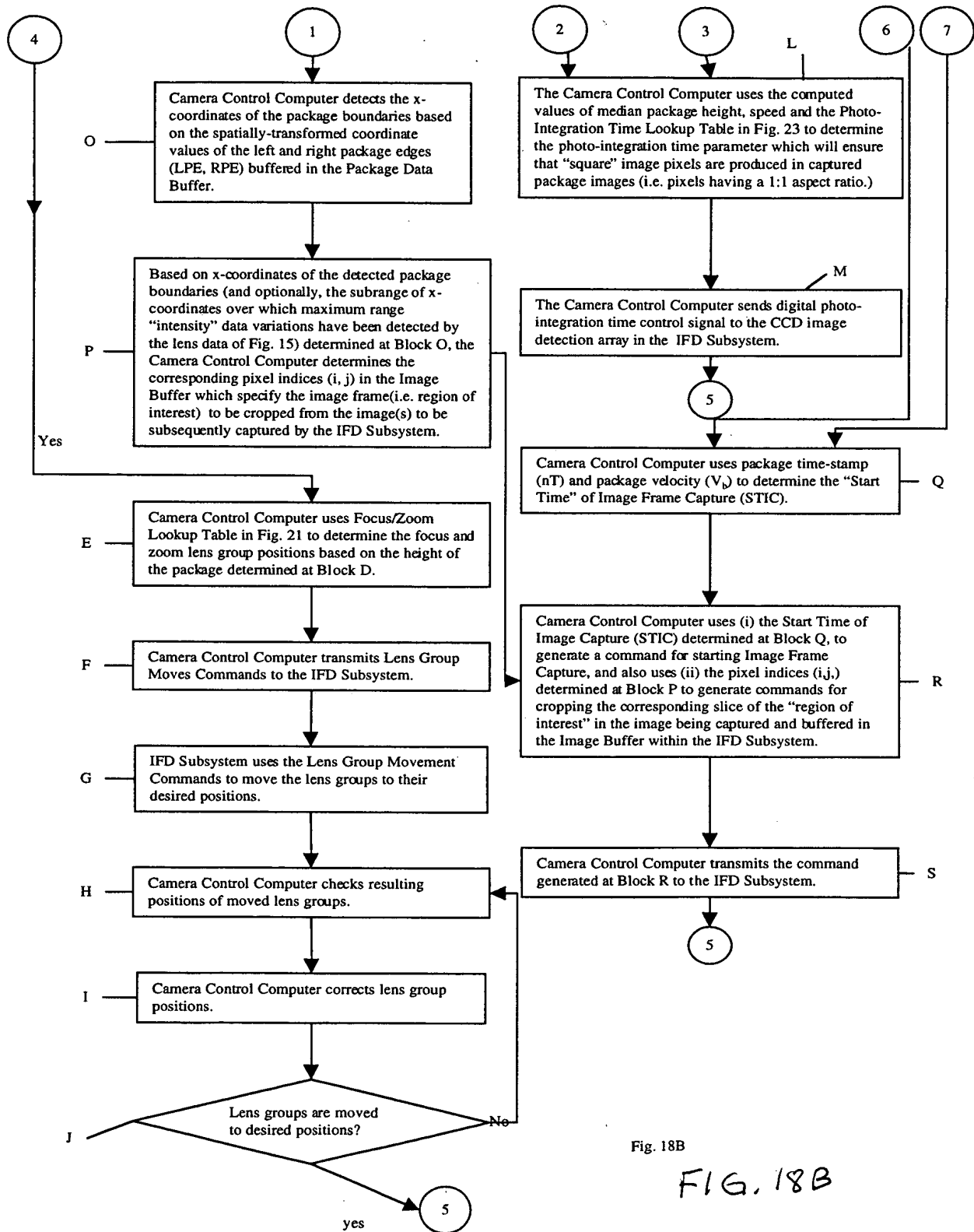


Fig. 18B

FIG. 18B

x coordinate subrange where maximum range "intensity" variations have been detected

### Package Data Buffer (FIFO)

Fig. 19

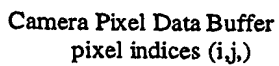


Fig. 20

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Zoom and Focus Lens Group Position  
Look-up Table

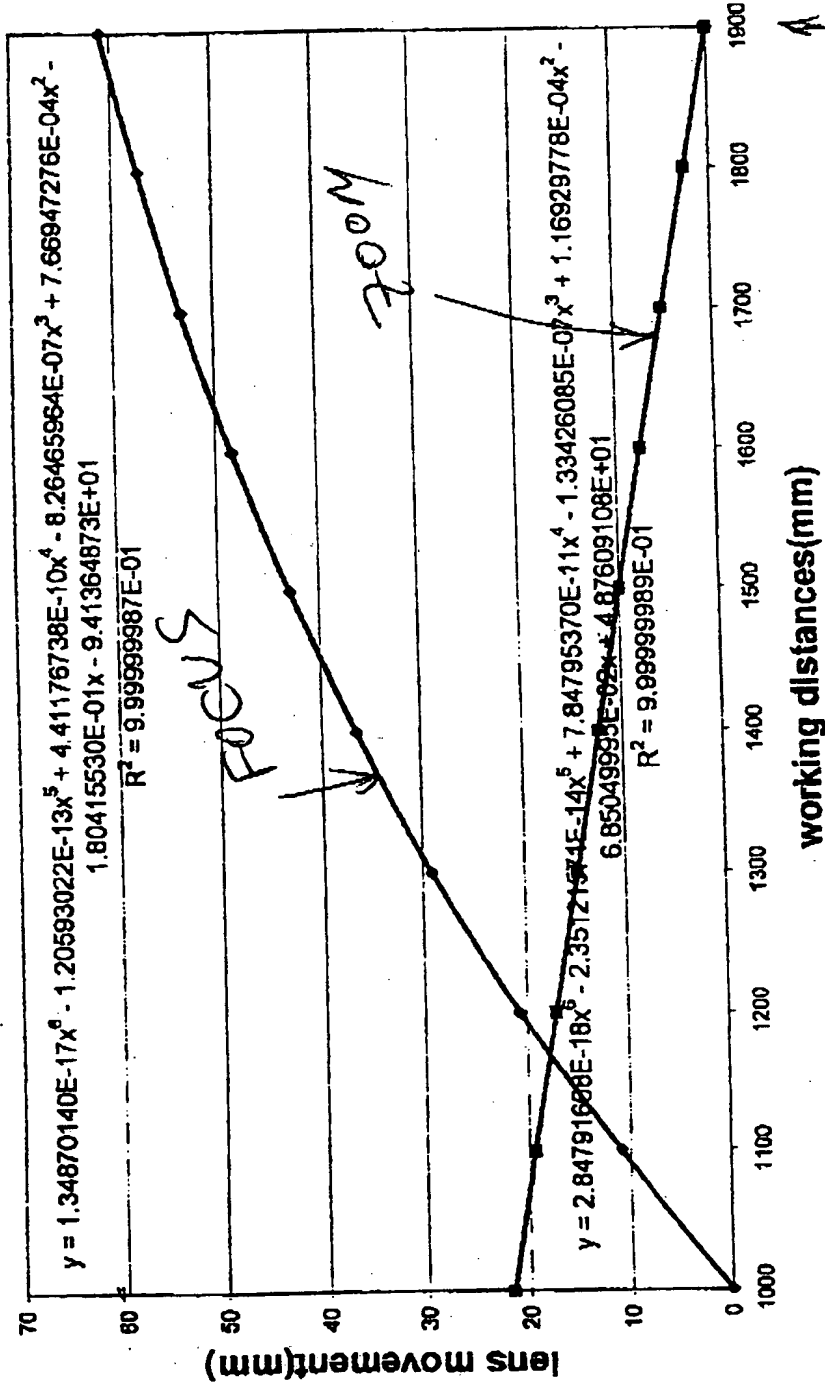
Distance from Camera H (mm)	Zoom group distance (mm) Y (Zoom)	Focus group distance (mm) Y (Focus)
1000	21.57489228	2.47E-05
1100	19.38089696	10.99009783
1200	17.10673434	20.65783177
1300	14.77137314	29.10917002
1400	12.39153565	36.47312595
1500	9.979114358	42.87845436
1600	7.540639114	48.44003358
1700	5.078794775	53.25495831
1800	2.595989366	57.40834303
1900	0.099972739	60.98883615

(use  
interpolation  
techniques  
for walking  
distances  
between listed  
points in  
table)

FIG. 21

\* Note: The focal distance & zoom (eff. focal length) of camera lens are coupled (interdependent) in camera has a fixed aperture F5.6

# Focus and Zoom lens movement vs. working distances



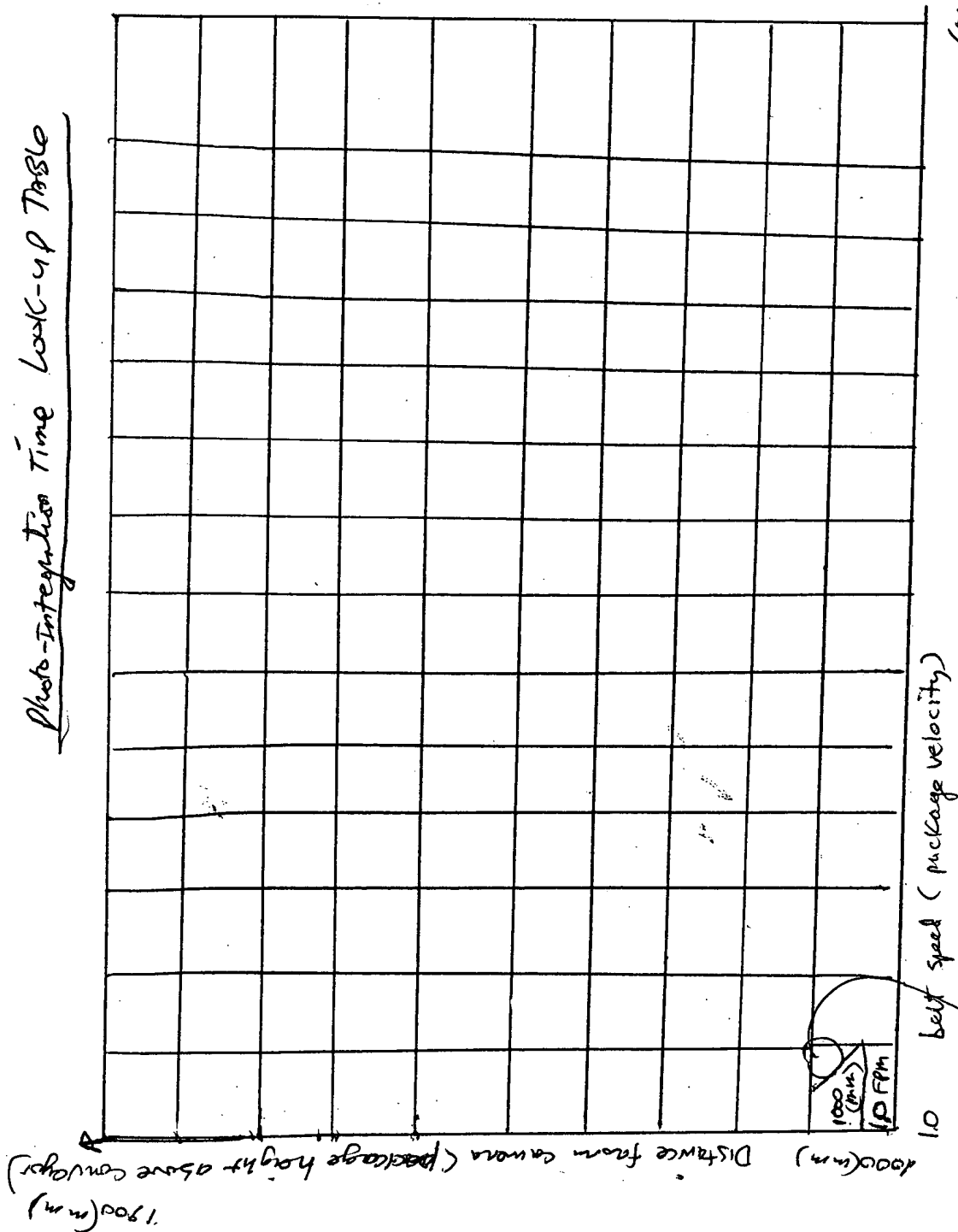
—●— zoom 1 —■— zoom 2 — Poly. (zoom 1) — Poly. (zoom 2)

↑ (inches) 36 above conveyor belt  
 ← package height above conveyor  
 conveyor-belt surface

FIG. 22

[illegible]

## Photo-Integration Time Look-up Table



600 feet per minute  
(FPM)

FIG. 23

Photo-integration  
time value that  
ensures square image pixels  
(1:1 aspect ratio)

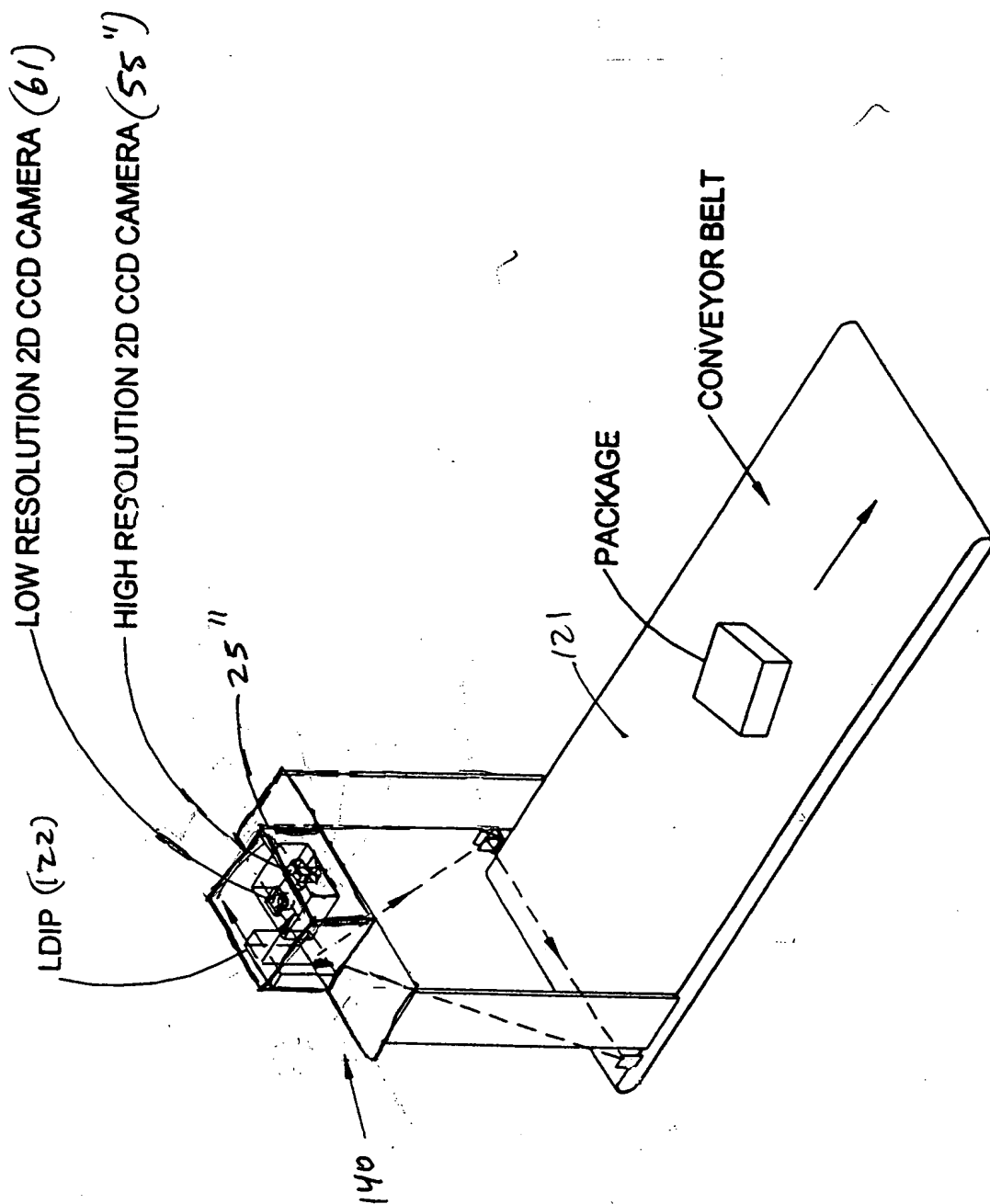


FIG 24





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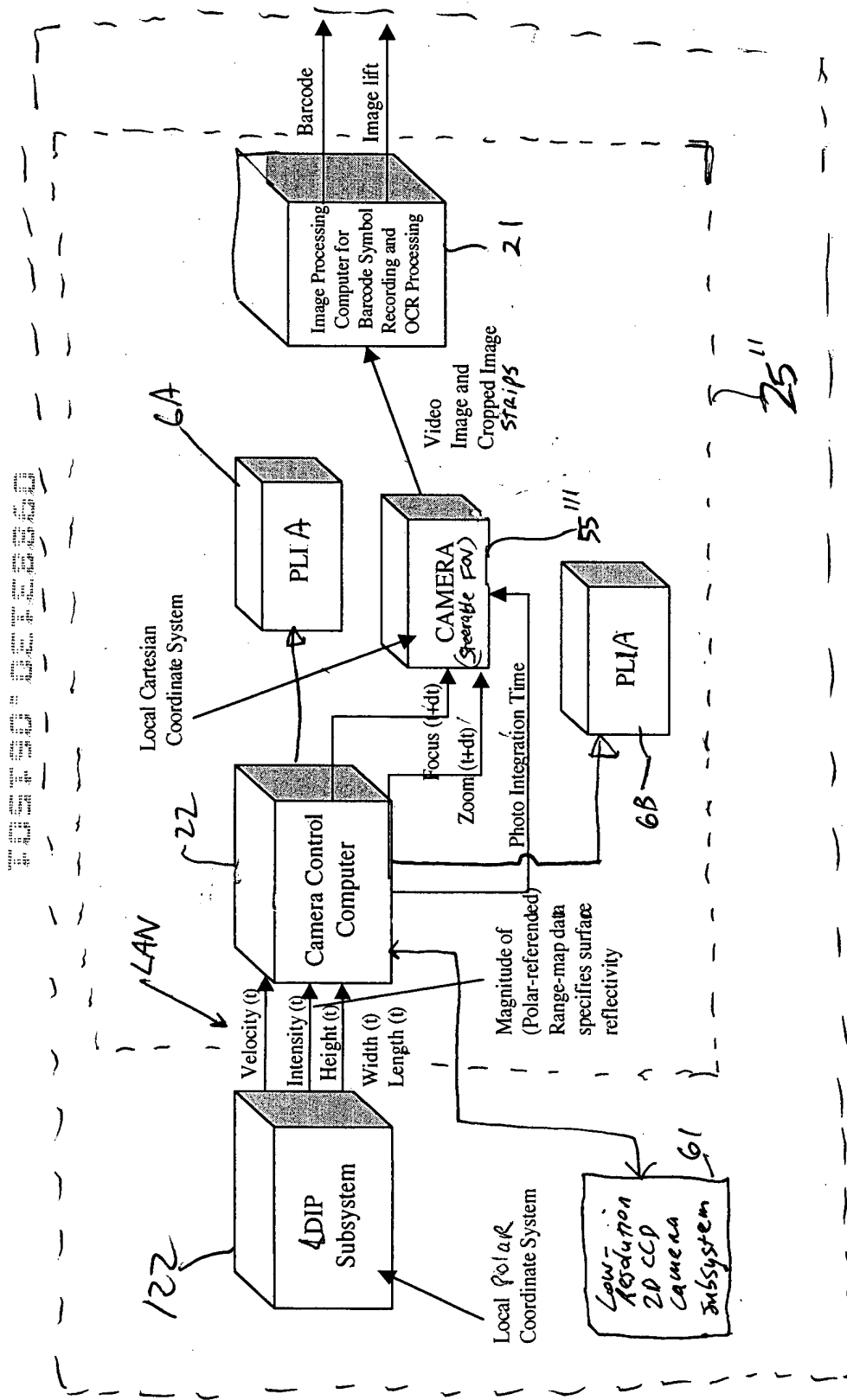


FIG. 26

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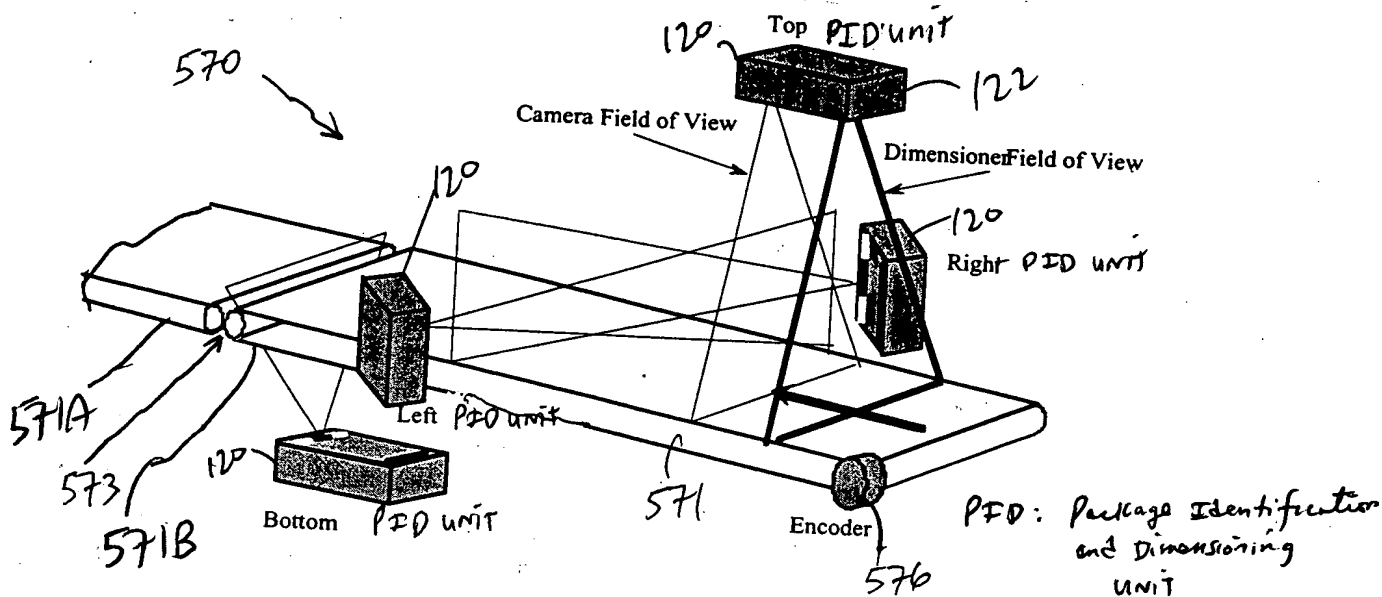


FIG 27

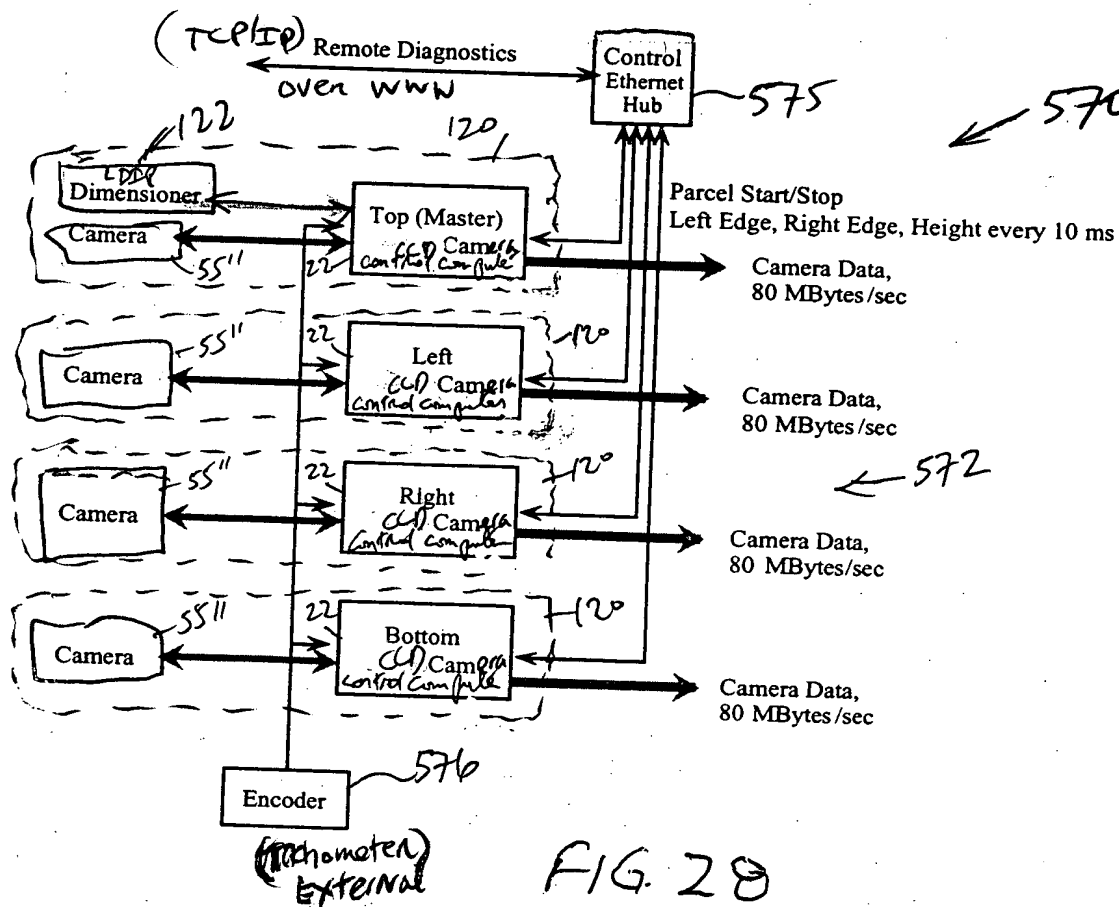


FIG 28

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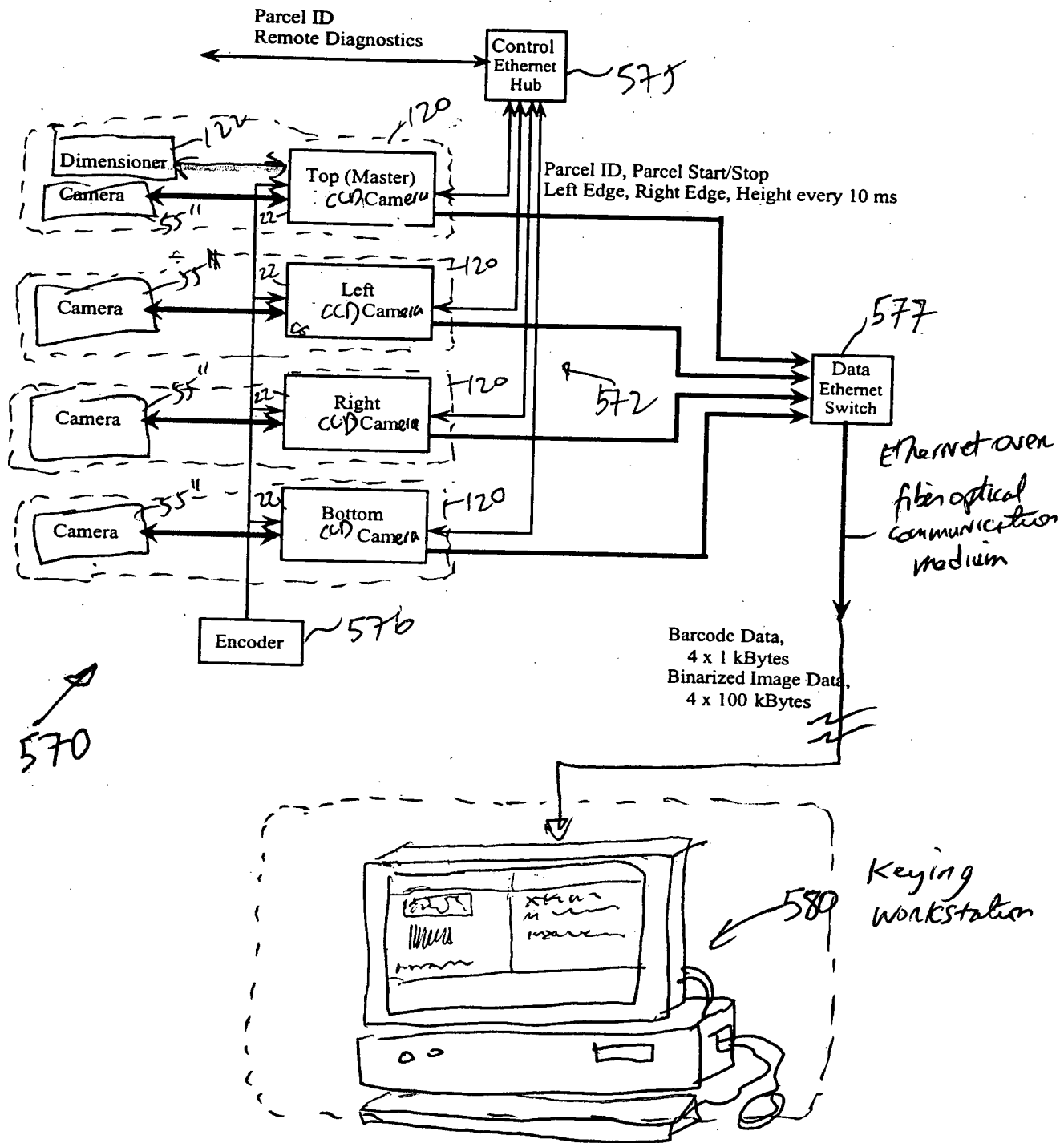


FIG. 29

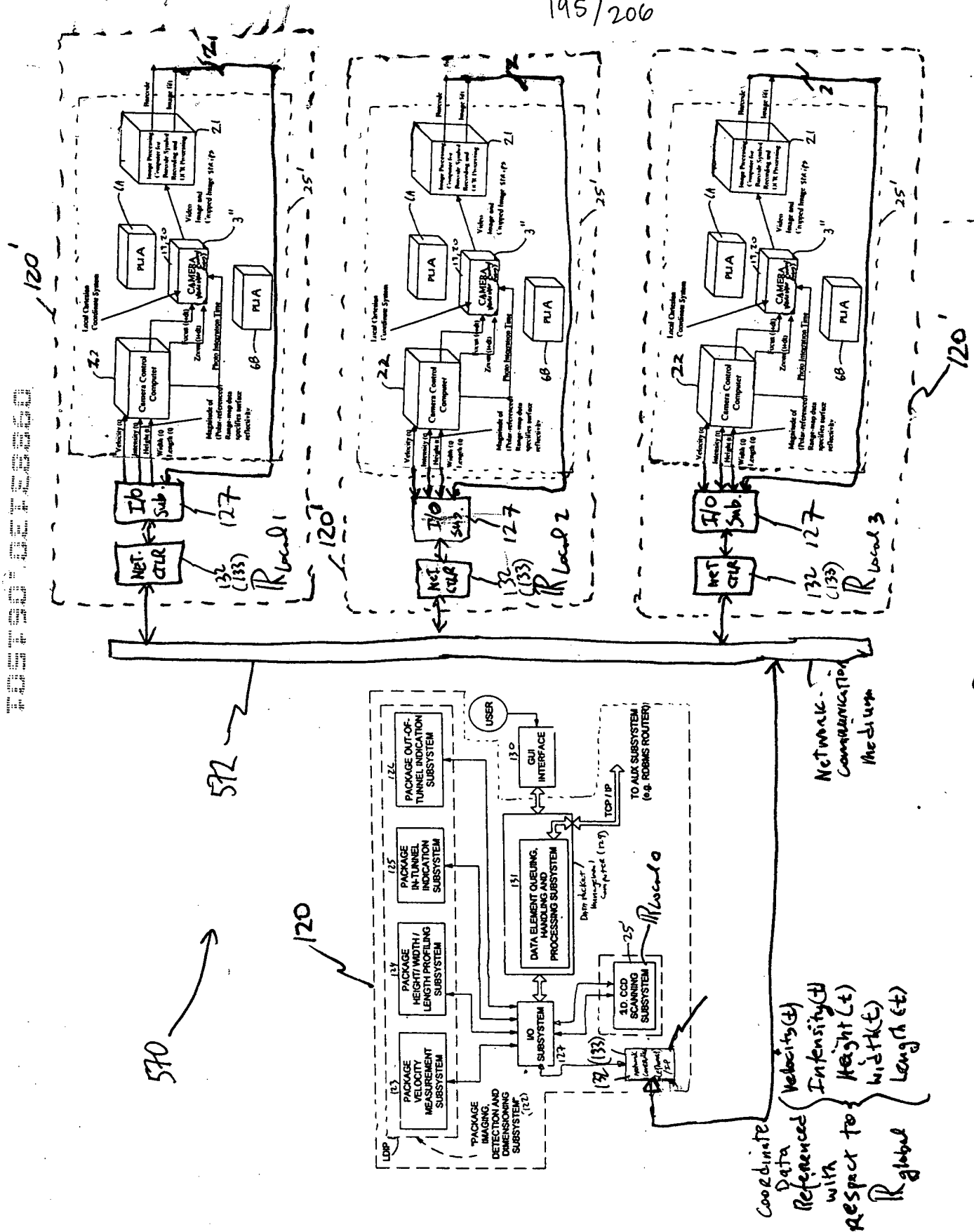
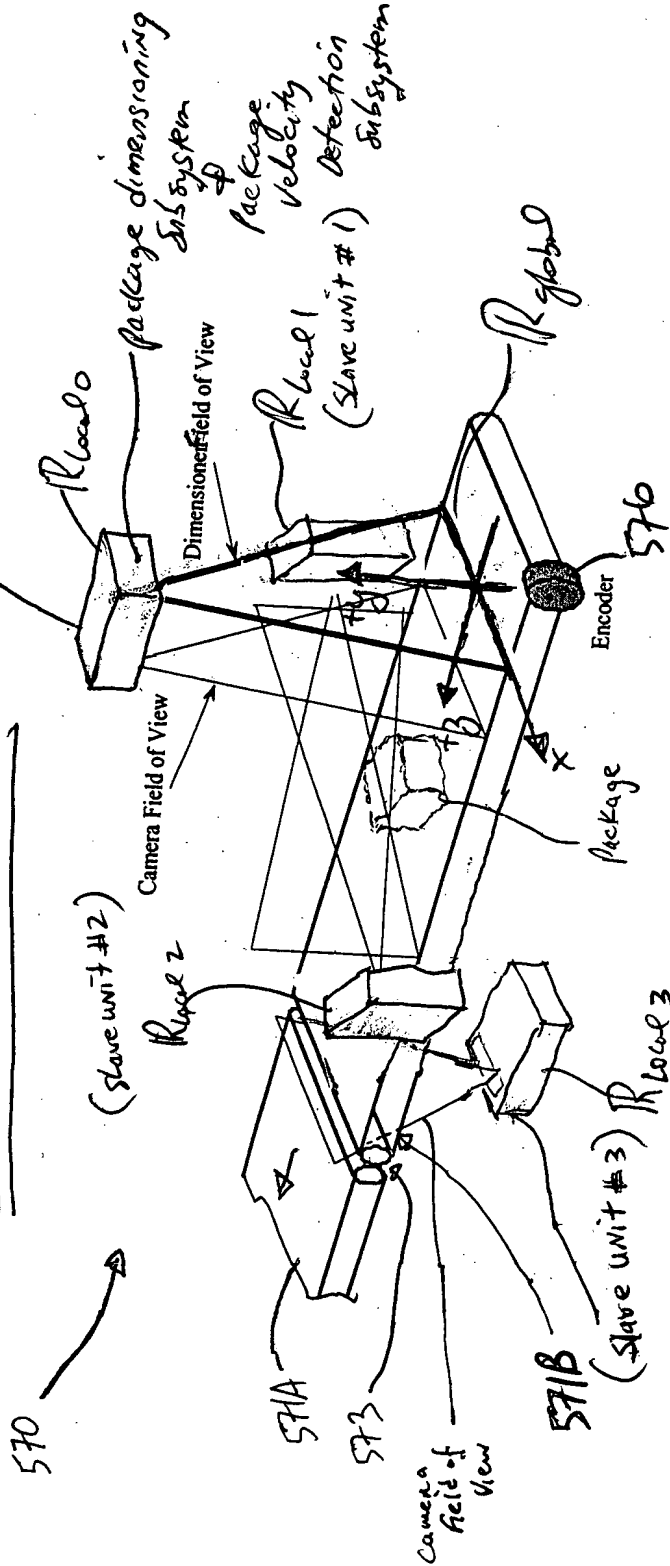


FIG 30

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CCD Camera-Based Tunnel System  
Employing Package Coordinate Data  
Driven Method of Automatic Camera  
Zoom and Focus Control



Package coordinate data  $\parallel$   $R_{local}$   $\Rightarrow$   $R_{global}$   $\Rightarrow$  Package coordinate data  $\parallel$   $R_{local}$

FIG. 31

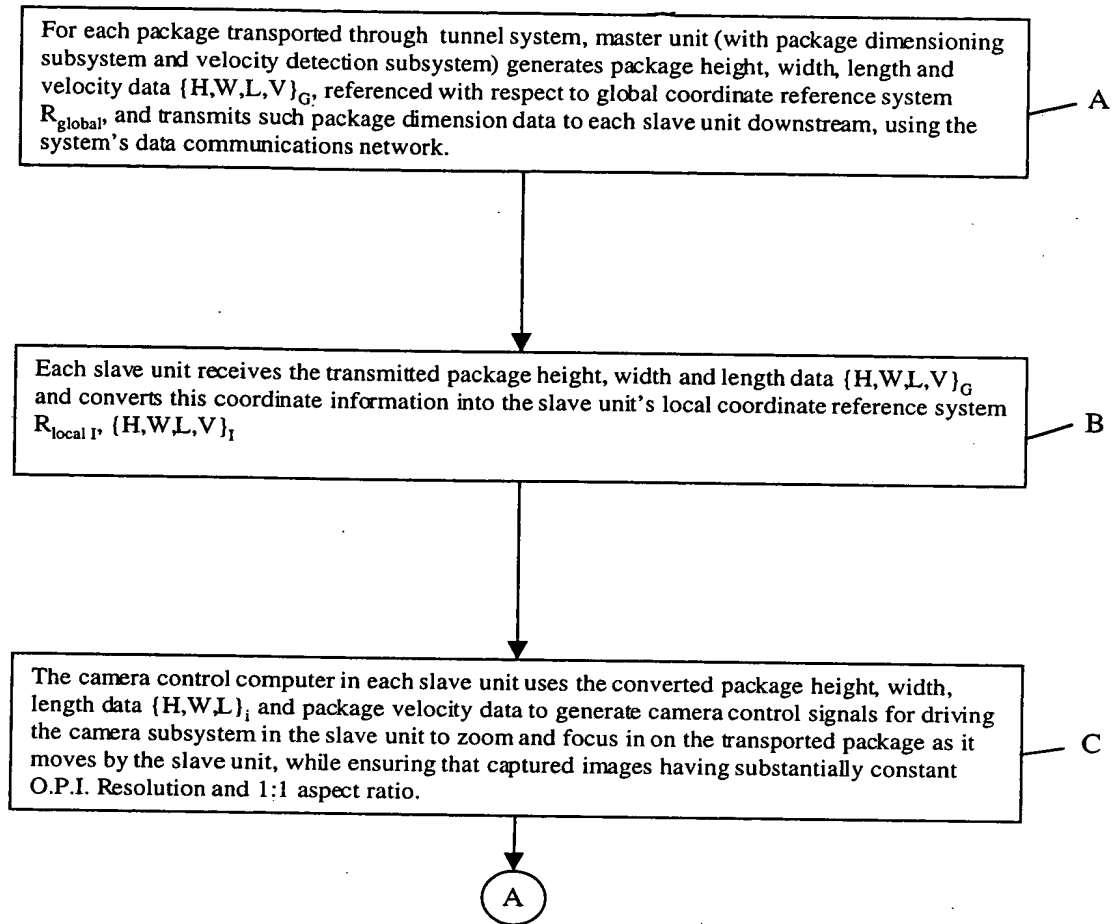


FIG. 32A

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Each slave unit captures images acquired by its intelligently controlled camera subsystem, buffers the same, and processes the images to decode bar code symbol identifiers represented in said images, and/or to perform optical character recognition (OCR) thereupon.

D

The slave unit which decodes a bar code symbol in a processed image automatically transmits a package identification data element (containing symbol character data representative of the decoded bar code symbol) to the master unit (or other designated system control unit employing data element management functionalities) for package data element processing.

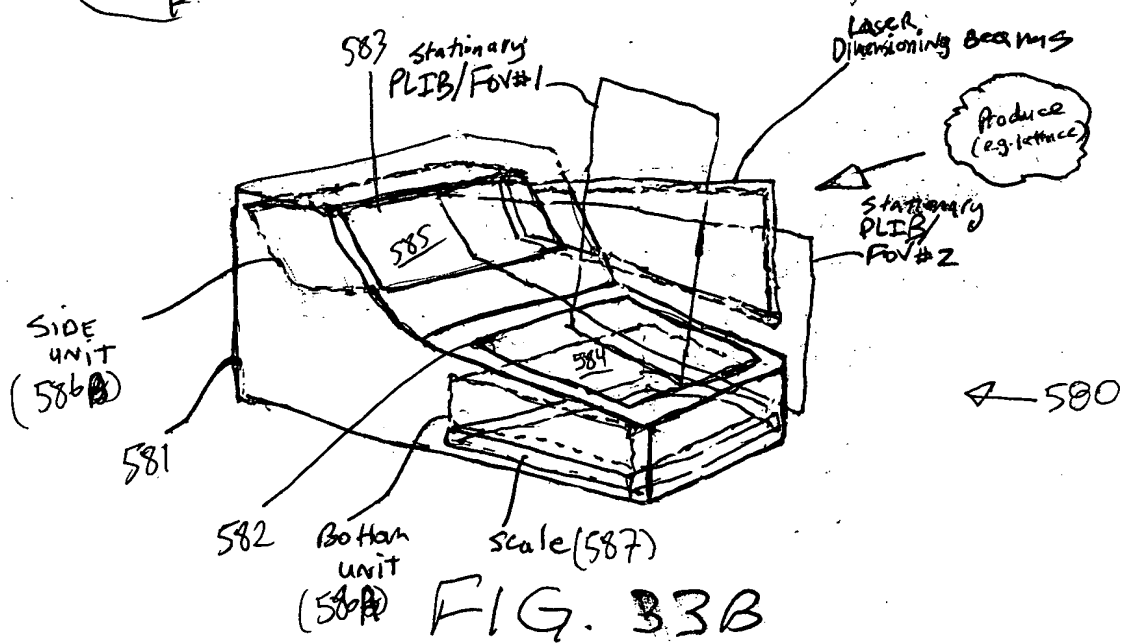
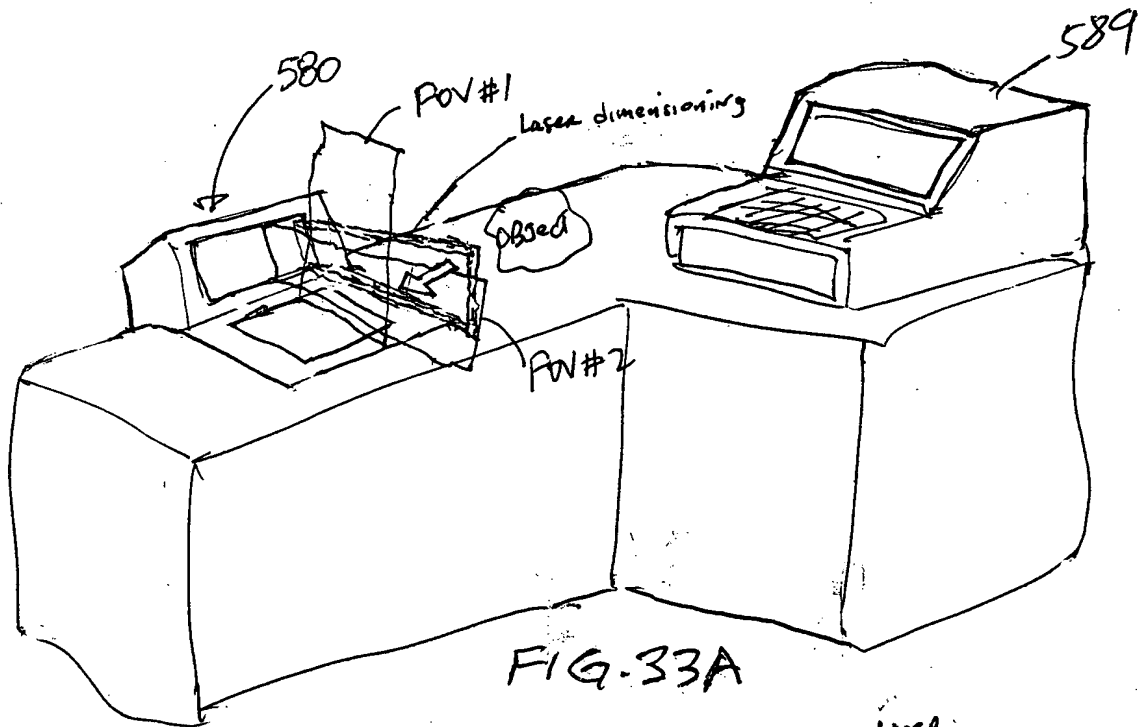
E

Master unit time-stamps received package identification data element, places said data element in a data queue, and processes package identification data elements and time-stamped package dimension data elements in said queue to link each package identification data element with one said corresponding package dimension data element.

F

FIG. 32B

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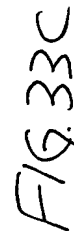


FIG. 33C

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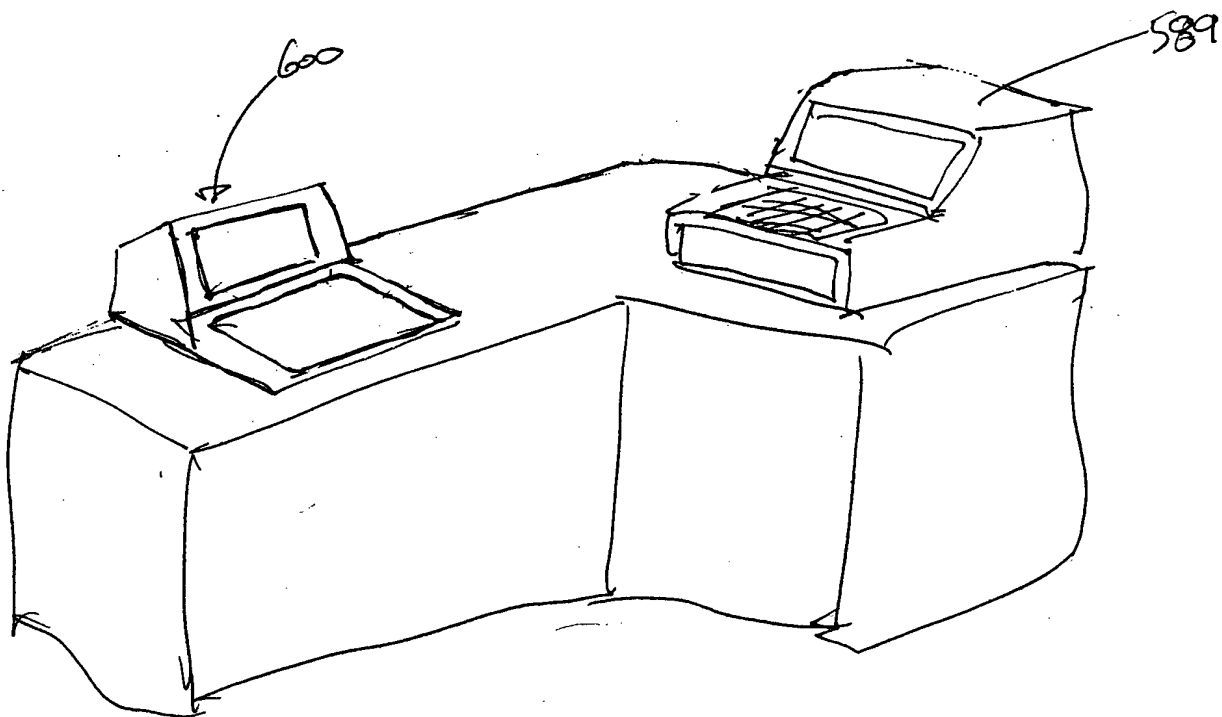


FIG. 34A

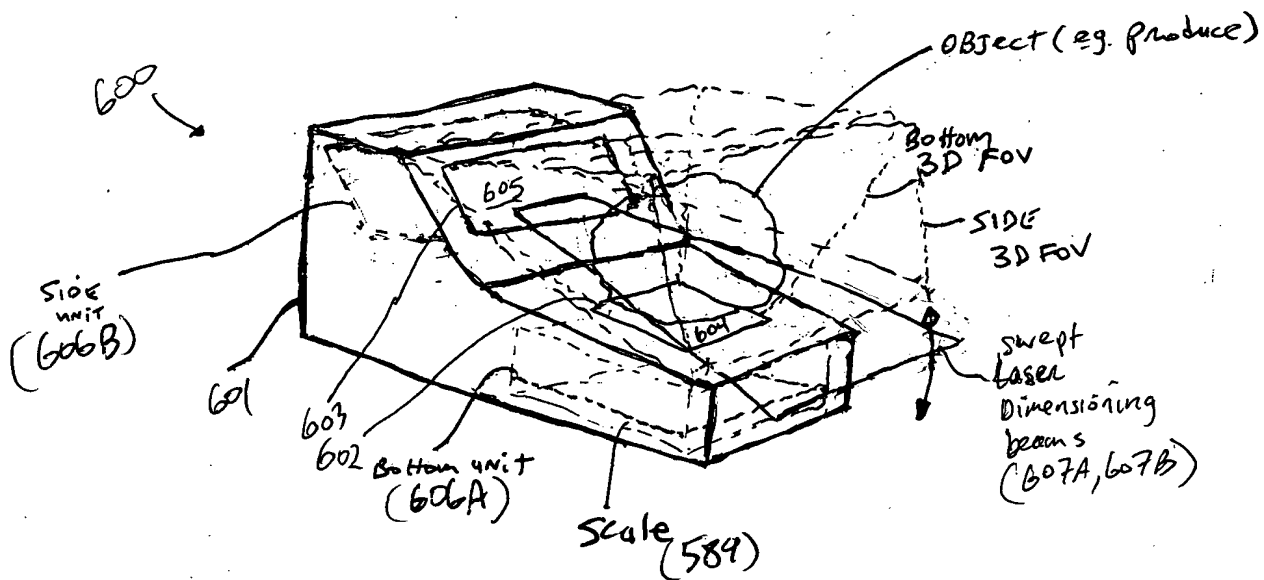


FIG. 34B

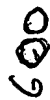


FIG. 34C

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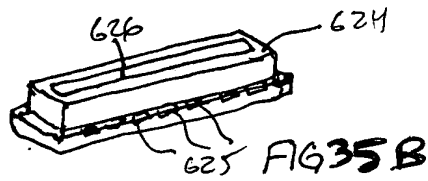
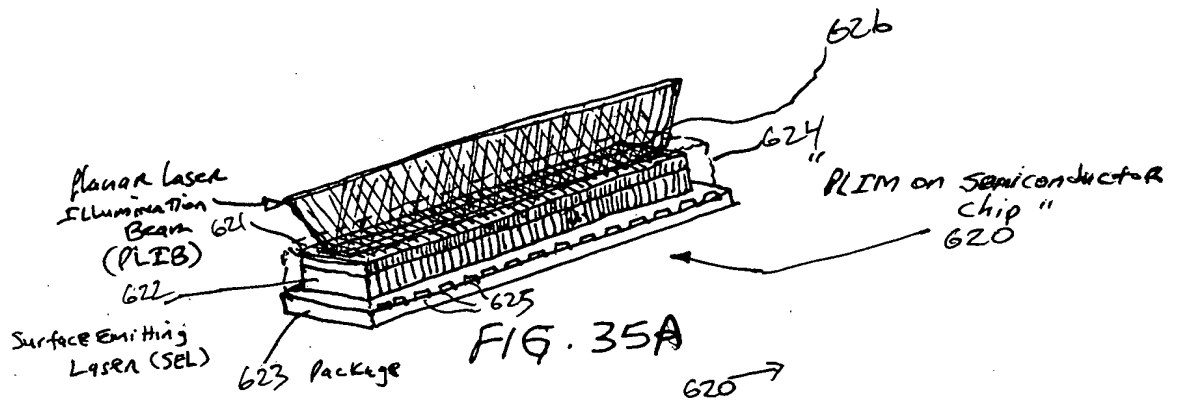
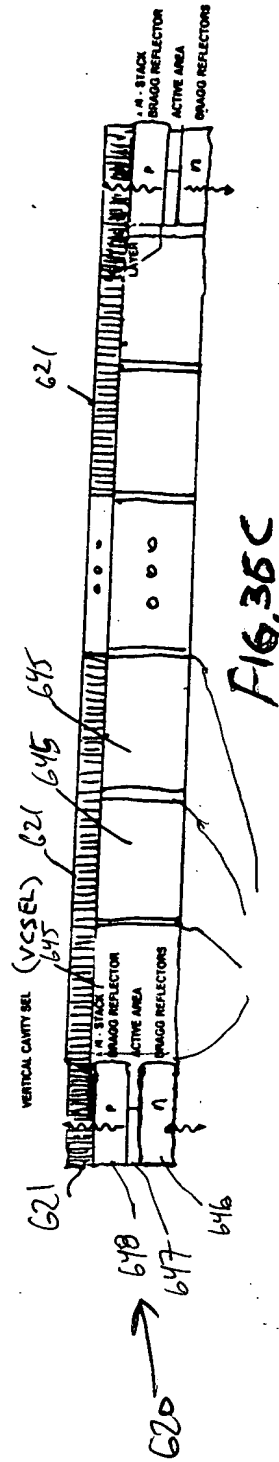
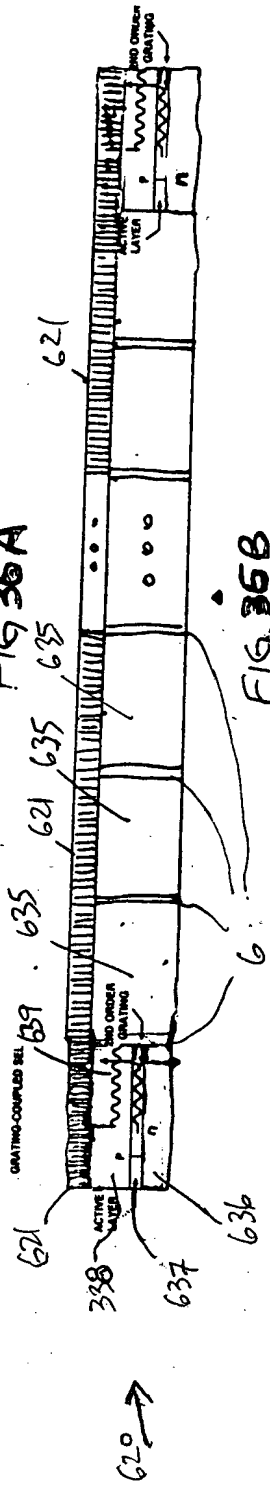
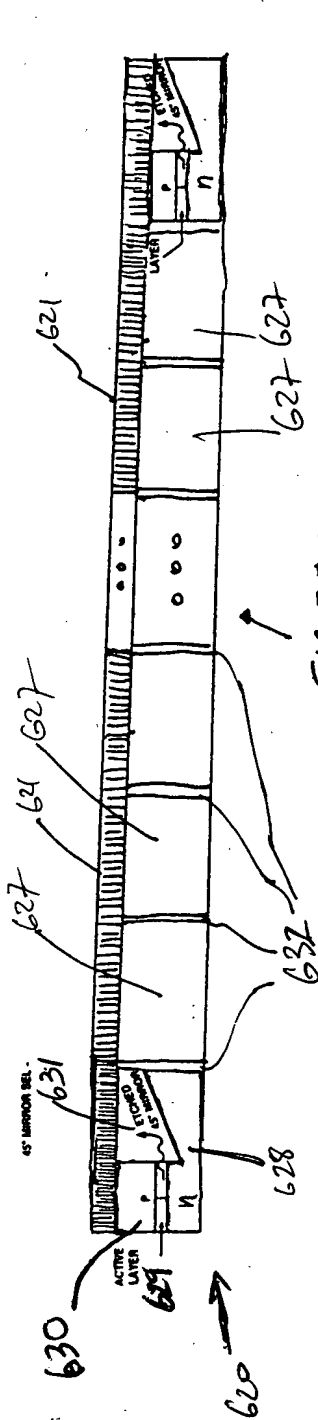


FIG. 35A



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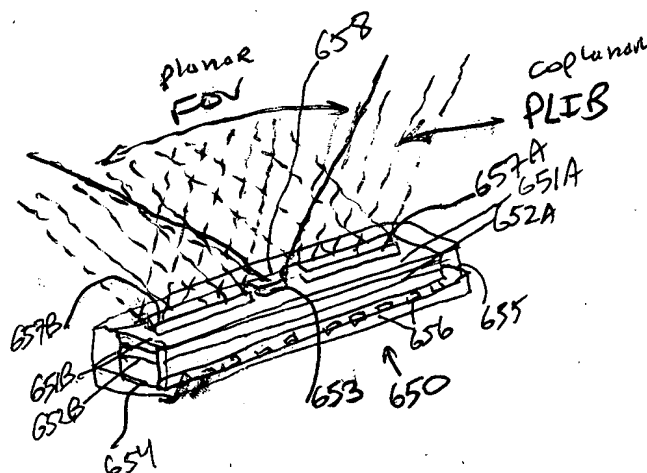


FIG. 37

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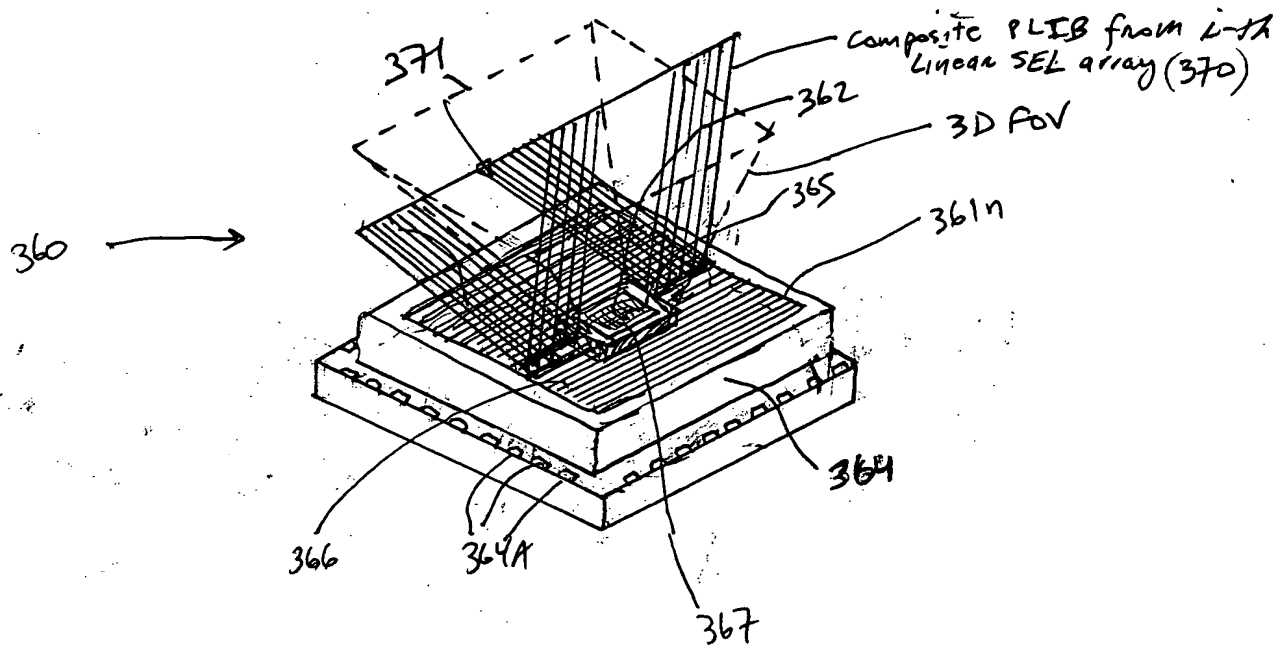


FIG. 38A

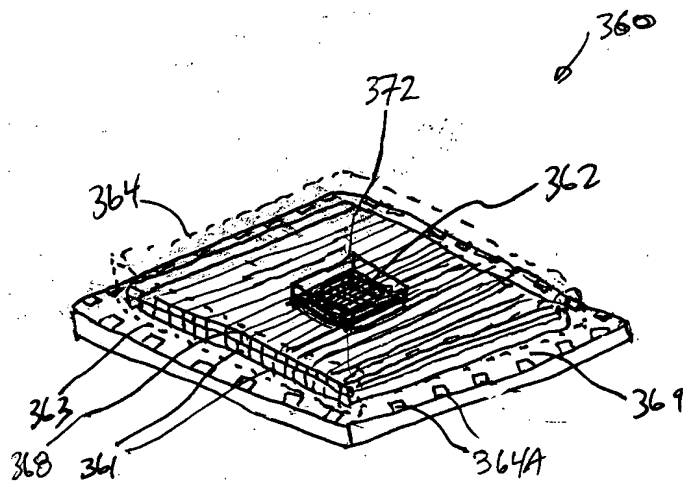


FIG. 38B